Osprey®

by VARIOSYSTEMS

Osprey® PCI User Guide

For PCI Video Capture Cards

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WARNING: Connections between this device and peripherals must be made using shielded cables in order to maintain compliance with FCC radio emission limits.

WARNING: Modifications to this device not approved by Osprey by Variosystems could void the authority granted to the user by the FCC to operate the device.

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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the computer into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

If the above measures are unsuccessful, please consult the dealer or manufacturer of your radio or television receiver, or speak with an experienced radio/TV technician.

Note: This reminder is provided to call to the CATV installer's attention Section 820-40 of the NEC, which provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

Shielded Cables: Connections between this device and peripherals must be made using shielded cables in order to maintain compliance with FCC radio emission limits.

Modifications: Modifications to this device not approved by Osprey by Variosystems could void the authority granted to the user by the FCC to operate the device.

Note to CATV Installer: This reminder is provided to call to the CATV installer's attention Section 820-40 of the NEC, which provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

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For current RoHS statement, visit www.ospreyvideo.com.

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Contents

Overview ***1***
Warranties 1
System requirements 2
Audience 2
Installation steps ***3***
Installing the driver 3
Installing the video capture card 4
Multiple board types 5
Setting driver properties ***7***
Osprey Config's initial processing sequence 8
Understanding the device properties window 10
Common buttons 11
Devices and global controls 12
Input tab 14
Video Input 15
Video Standard 16
Input Format 18
VideoCheck 20
VideoGraph 21
VbiGraph 22
Video Proc Amp tab 24
Video Decoder tab 27
RefSize tab 29
Horizontal Format 30
Horizontal Delay 31
Reference Size for Crop and Logo Placement 32
Source Width 33
Filters tab 35
SimulStream 36
Show N filters per device 37
Mode 39
Deinterlace 40
Device tab 45
No Video Test Pattern 46
Buffers Requested 46
Diagnostic Logging 47
Board numbering 48
Extras 49
Device Info 52
Captions tab 53

Pin Select 54
Render 55
Closed Caption DirectShow Pin 56
Logo tab 57
Pin Select 59
File and Color 59
Enable Key Color 60
Weighting 60
Position and Size 62
Size and Crop tab 63
Pin Select 66
Reference Size 66
Granularity 67
Enable Cropping 68
Default Output Size 70

AVStream driver reference information 72

Overview of Direct Mode and PostProcessing Mode 74
Direct Mode 74
PostProcessing Mode 75
Efficient Video Rendering 76
Preview Pin to Video Renderer 77
Preview Pin to Overlay Mixer to Video Renderer 77
Preview Pin to VMR7 78
Preview Pin to VMR9 79
Video standards and sizes 80
Color Formats 80
YUV Format Details 81
Closed Captioning (CC) 82
Vertical Interval Timecode (VITC) 84
Vertical Blanking Interval (VBI) Capture 86

Audio driver 87

Selecting the audio source and input volume 87
Audio properties 89
Audio Playback 90
Audio Configuration 90

Appendix A: Osprey hardware specifications 93

Osprey 100 93
Environmental specifications 93
Osprey 100 backplate 93
Osprey 210 94
Osprey 210 backplate 94
Osprey 230 95
Osprey 230 backplate 95
Osprey 440 96
Osprey 440 backplate 96
Osprey 530 97
Osprey 530 backplate 97

Appendix B: Troubleshooting 98

Scrambled Video Image 98
Poor Video Quality at Large Frame Sizes 98
Multiple Horizontal Lines Across Video Image 98
No Closed Captions on DV 99
Cannot Play Back Recorded Audio 99
Audio Recording Control Comes Up With Wrong Device and Wrong Inputs 99
Index 101

Overview

Thank you for purchasing the Osprey PCI video capture card. This user guide provides step-by-step instructions for installing and using your new video capture card. For the latest Osprey product information and news, visit our website at www.ospreyvideo.com.

Warranties

For complete warranty details, refer to the specific warranty included with each product. General warranty information includes the following:

Limited Warranty	Osprey warrants its hardware products against defects in material and workmanship under normal use for the period of one year (12 months) from date of sale. Where specific warranties exist that provide more substantial coverage, notwithstanding the warranty provisions herein, such product warranties control and preempt or supersede the warranty provisions herein.
Reseller Pass Through of Standard Limited Warranties.	Resellers pass the Osprey standard limited warranties for the products through to the customer without modification. Any modification of a product voids the Osprey warranties or any other existing or available warranty.

System requirements

Please note that the following system requirements relate to your Osprey® video capture card only. The video capture or encoding applications you use will likely require a much more powerful system than that which is listed below. Please consult your software documentation for applicable system requirements.

- Direct Mode: 2 GHz Intel® Pentium® 4 processor or better
- PostProcessing Mode and SimulStream®: 2 GHz Intel® Pentium® 4 processor or better, Dual Core or better recommended
- Microsoft® Windows® 7 Professional
- Up to 7.5 MB of available hard disk space
- 256 MB of RAM, 512 MB recommended
- One available PCI-X™ slot

Audience

The audience for this user guide includes anyone who uses or administers the Osprey 100, 210, 230, 440, and 530 cards. Users should have a basic technical understanding of streaming media. This user guide provides information only on these cards.

Installation steps

Use the installer package file (.msi) whether you obtained the driver on a CD or through download. The file automates the Plug and Play steps needed to install the drivers and ensures that they are performed correctly. The installer package file also installs OspreyConfig and the User's Guide. If you have multiple Osprey video capture cards in the system it configures all of the boards at the same time.

Osprey recommends this method especially if Osprey software does reside on your host computer. After the installer is run, the software detects the card and its drivers initiate automatically.

If updating Osprey software, then uninstall the previous software version, reboot your computer and install the update.

Installing the driver

Insert the Osprey software CD into your CD-ROM drive. The main menu for the Osprey software will appear if autoplay is enabled. If the main menu does not automatically appear, click on the Window's computer Icon and select the CD-ROM and the msi icon. The Osprey AVStream – Install Shield Wizard will engage and will guide you through the installation process.

Installing the video capture card

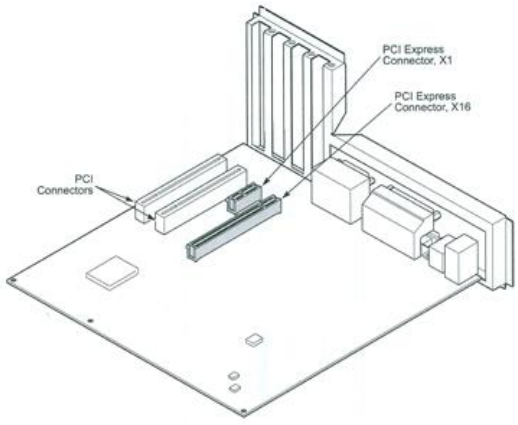
All computer cards are sensitive to electrostatic discharge. Slight electrostatic discharges from clothing or even from the normal work environment can adversely affect these cards. By following these simple guidelines, however, you can minimize the chance of damaging the Osprey video capture card.

- Handle cards only by the non-conducting edges.
- Do not touch the card components or any other metal parts.
- Wear a grounding strap while handling the cards (especially when located in a high static area).
- Properly ground your computer to avoid static discharge.
- Ensure the workstation is powered off before installing any components.
- If you are not familiar with how to install a PCI bus card, refer to the system's documentation for more complete, step-by-step instructions.
- Install the card only in UL Listed computers that include instructions for user-installed accessories

To install the video capture card:

1. Power down your computer.
2. Remove the computer's cover and locate an empty PCI or PCI-X slot.

   WARNING! Be sure to install the card in the PCI or PCI-X slot. This slot is usually black. Refer to the following diagram as a guide. Placing the card in the wrong slot can damage the card.



3. Remove the cover screw from the empty PCI slot's cover, set the screw aside.
4. Remove the slot cover.
5. Remove the Osprey video capture card from its anti-static bag.
6. Insert the Osprey card into the desired PCI slot and make sure it is seated evenly.
7. Secure the back panel of the card with the slot's cover screw.
8. Replace the computer cover.
9. Plug in and turn the computer on.

Multiple board types

There are a number of Osprey devices. Each class requires its own driver.

class 1: o100, o200, o210, o220, o230
class 2: o300
class 3: o440
class 4: o530, o540, o560
class 5: o700e HD and later DSP-based PCI-Express products
class 6: o240e, o450e and related non-DSP PCI-Express products
class 7: o260e, o460e
class 8: o820e, o845e

Each device class has a separate driver. This user guide applies only to classes 1 through 4.

If you have both an Osprey 230 and an Osprey 240e in the same machine, then you need drivers to accommodate the different cards.

When you add or move boards after the AVStream drivers are already installed, and then move a board from one slot to another, the following sequence begins.

To move a board from one slot to another:

1. The New Hardware Wizard runs and displays the Found New Hardware window followed by the Digital Signature Not Found window (Figure 1).

Figure 1. Digital Signature Not Found Screen

Software Installation
The software you are installing has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the software vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

2. Click **Continue Anyway**.

   The Controller installing window displays, and the text inside this window changes to Osprey Video Capture Device, Installing .... Then the Digital Signature Not Found window displays on top of it.

3. Click **Continue Anyway**. The Completing the Found New Hardware window displays.
4. Click **Finish**. The Digital Signature Not Found window displays.

   This window displays once for each Osprey board you are installing. The Systems Setting Change window displays.
5. Click **Finish** and restart the system (Figure 2).

Figure 2. System Settings Change dialog box

System Settings Change
Windows has finished installing new devices. The software that supports your device requires that you restart your computer. You must restart your computer before the new settings will take effect.
Do you want to restart your computer now?
Yes
No

Setting driver properties

After you install the Osprey card and driver, you will be able to access the card's properties through most major DirectShow applications (such as WME). Access card property pages through Osprey Config, the utility bundled with our latest driver suite. Once installed you can see the card's default settings and change them as needed.

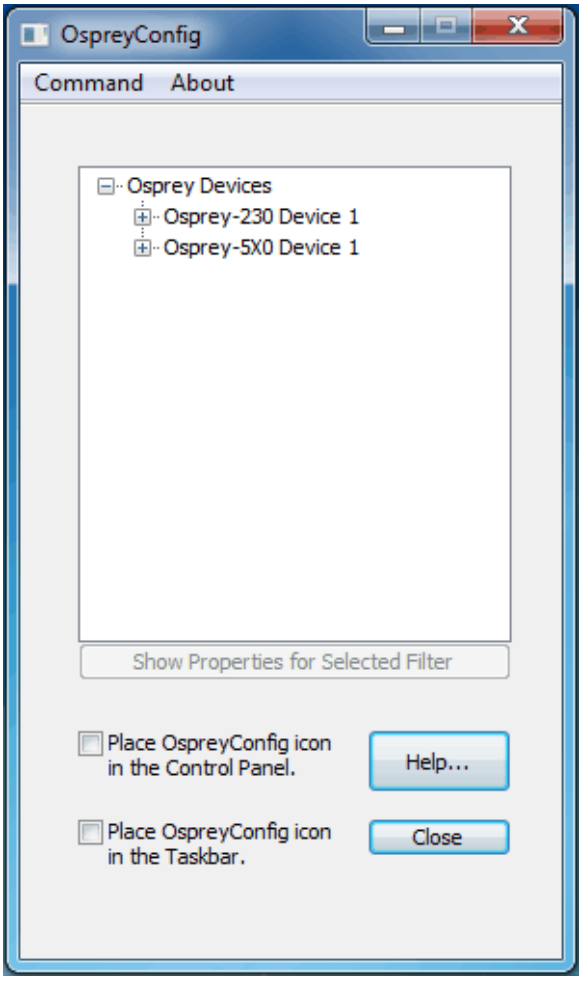
To open Osprey Config, select **All Programs** in the start menu of your Windows computer, then select **Osprey ➢ Osprey AVStream ➢ Osprey x 32 bit** or (**Osprey x 64 bit**) ➢ **Osprey Config x 86** or (**Osprey Config x 64**).

Note: Other Direct Show applications can find the property page too. If you use a third-party application, you will find how to access the card's settings in the documentation for that application.

Osprey Config's initial processing sequence

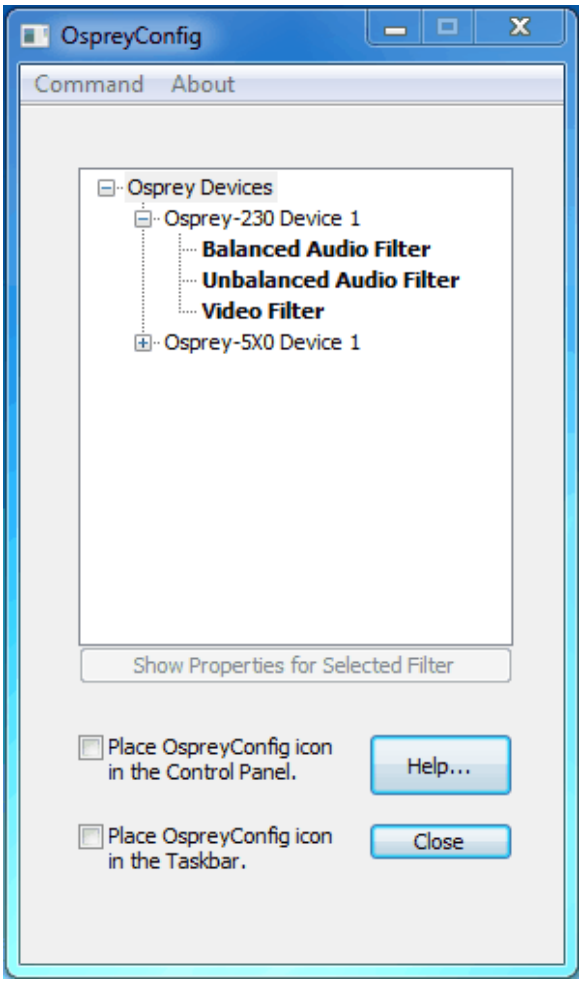
After you open Osprey Config the application displays (Figure 3) showing the cards and devices installed on your computer. The main window depicts a tree view of Osprey audio and video capture filters installed in the system. They are organized by device – each device has an Audio Filter and Video Filter.

Figure 3. Initial Osprey Config user interface



In this example, the computer has two cards, each with an audio and a video filter. The cards are the Osprey 230 and the Osprey 5X0. Both cards can take a single input and stream its content differently. For example, you can use several bit rates, sizes and formats. You can set the defaults of a card by clicking the **+** icon on the left side of the device you want to configure (Figure 4).

Figure 4. Selecting a device for configuration



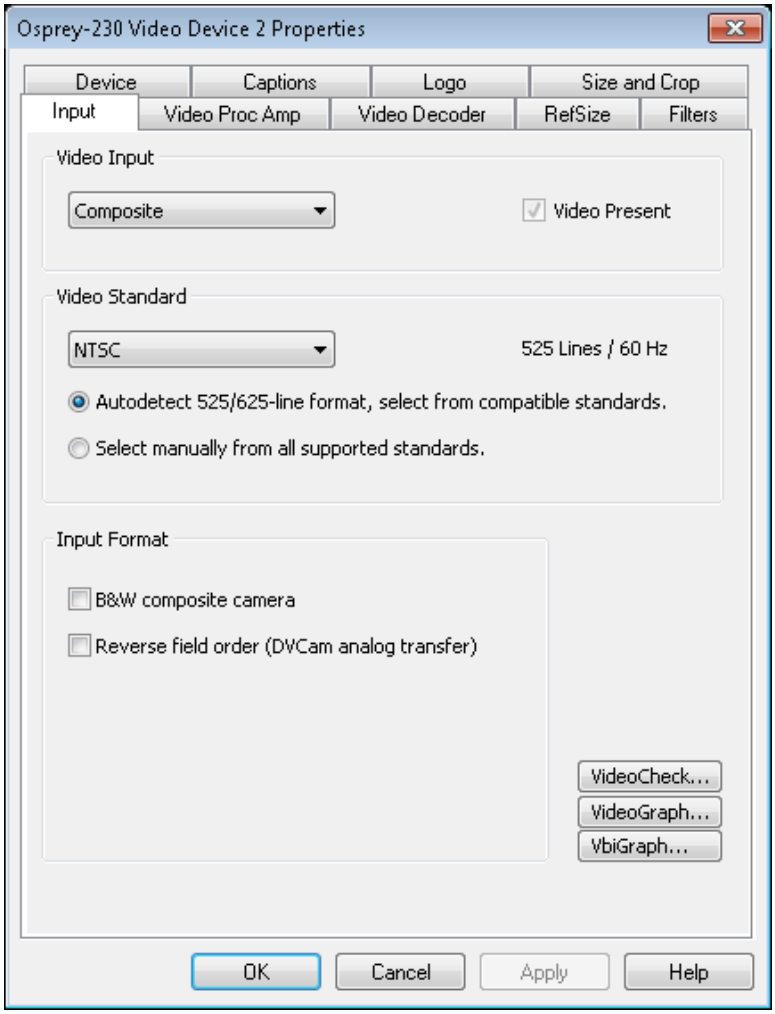
When you select a device and filter, the **Show Properties for Selected Filter** button becomes active.

Understanding the device properties window

The Osprey device window allows you to view and change the default settings of your driver. If you familiarize yourself with the video card's properties you can make changes to get the optimum performance from your card and change settings in real time.

Device properties are visible through tabs with different controls. Figure 5 illustrates the Device Properties window with tabs that take advantage of the driver's functionality.

Figure 5. Osprey's Device Properties window



Note: The Vbi Graph button is only for analog boards. If you installed an analog and a digital board (such as the Osprey 530), the graph will not display for the Osprey 530.

The Properties are organized as tabs or pages in a dialog box entitled Video Capture Properties.

Input	Select the video input, NTSC / PAL / SECAM video standard and Input Format.
Video Proc Amp	Set brightness, contrast, saturation, hue, gamma, and sharpness.
Video Decoder	Select the video standard – NTSC, PAL, SECAM.
RefSize	Setting Horizontal format and delay, source width and so forth.
Filters	SimulStream®, deinterlace, and inverse telecine*.
Device	Test Pattern, Capture Buffers, Diagnostic Logging.
Captions	Set up on-video closed-caption rendering.
Logo	Set up on-video logos.
Size and Crop	Set the default size, enable cropping, and set the cropping rectangle.

* Telecine refers to the technology used to transfer or repurpose analog film into electronic media.

Common buttons

The following information applies to controls that are not interactive.

OK	Commits the changes you have made on the currently displayed page, and exits the dialog.
Cancel	Exits the window without committing the changes you have made on the currently displayed page. Changes made before the most recent click of **Apply** are not cancelled.
Apply	Commits the changes you have made on the currently displayed page, without exiting the dialog.

Some controls are interactive – changes you make are immediately updated on the video. Examples are the brightness, contrast, hue, saturation, and sharpness controls, the graphical gamma control; and the graphical sizing and positioning controls for logos. **OK**, **Cancel**, and **Apply** have no effect on these controls.

In all cases, **Help** accesses this help module. The button on each tab displays the description for that page.

*Note: **OK** and **Apply** commit only the changes on the currently displayed page. To set changes on three different pages you need to click **Apply** twice and **OK** once.*

Devices and global controls

Some of the Osprey AVStream driver's controls work interactively. Changes in value immediately update the video stream output. Examples include brightness, contrast, hue, saturation, and sharpness.

In some applications, additional tabs may also display. The additional tabs are system supplied, for-your information only; you cannot set these controls.

The groupings of Osprey board models to driver binaries are as follows (o100, and so on, are short for Osprey 100, and so on).

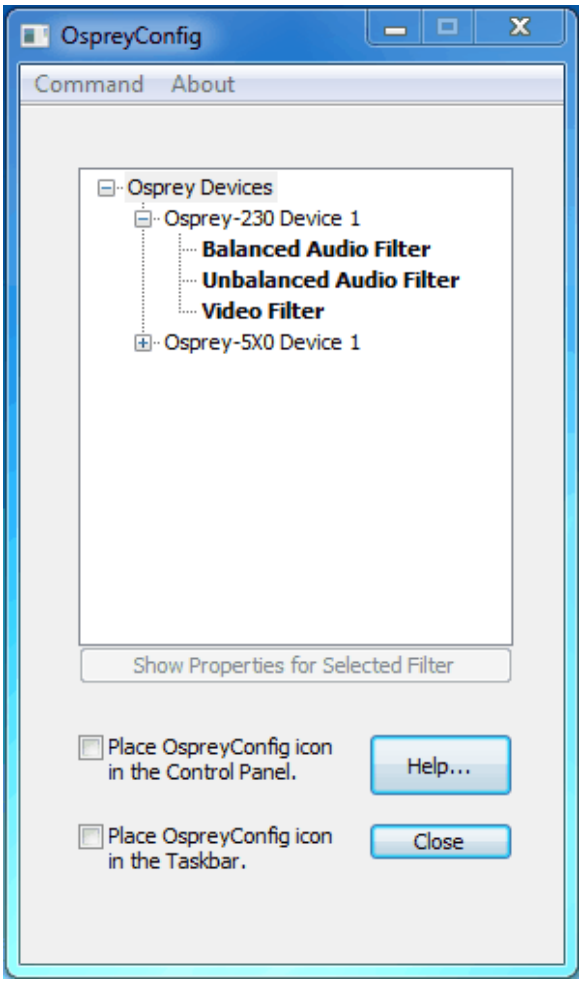
o200avs	o100, o200, o210, o220, o230
o300avs	o300
o440avs	o440
o540avs	o530, o540, o560

Most Osprey video cards, with the exception of the 100 series, have the ability to present multiple output streams from a single input device. For example, your company may wish to do a webcast globally to resellers, users, or potential customers. Using the Filters tab, you can set up different output streams to accommodate users with different rate modems.

Some changes, such as cropping, logos, and captions, may affect the filter. For example, if you change the logo on one device and its filter, the logo changes only on that filter (Figure 6).

If you change the values on Video Proc Amp, Video Decoder, Input, Filters, Device and, or RefSize tabs, the effect becomes global to the card. All characteristics on each device on the card change to those changed on a single device. This change is limited to the card on which the device changed. If you make changes on an Osprey 230 card residing with an Osprey 530 card, a change on the Osprey 530 will not affect the Osprey 230 devices.

Figure 6. Osprey Config utility to access devices

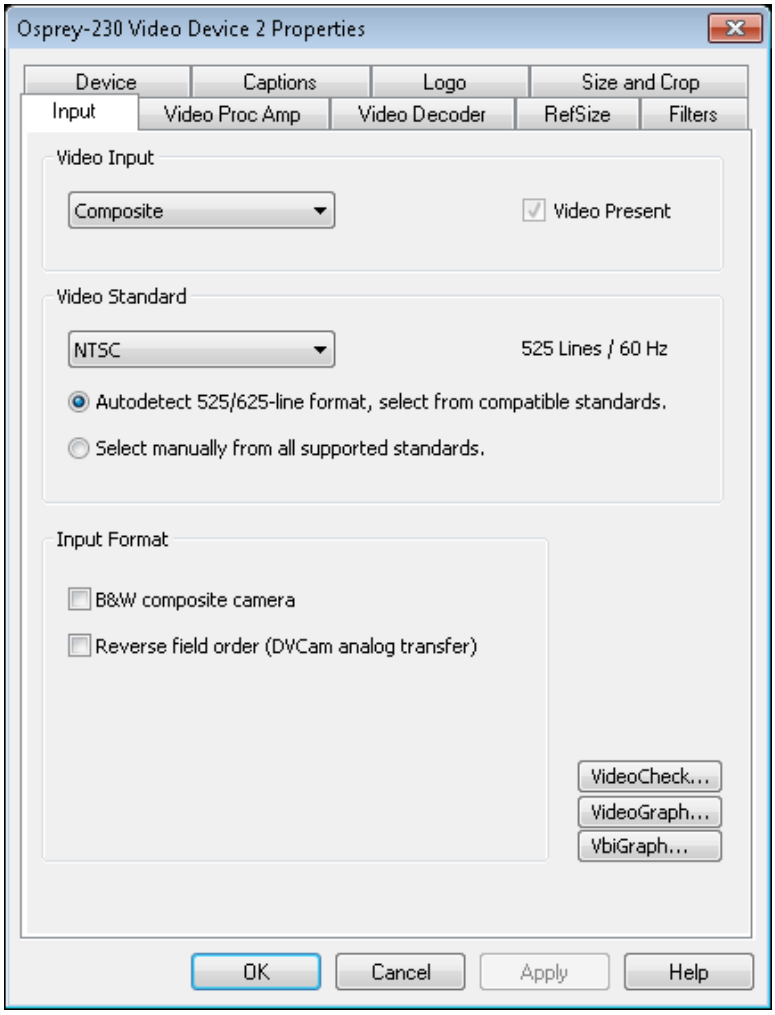


You will see reference to “pins and filters” in DirectShow® discussions. These terms require technical experience with Microsoft’s DirectX® 9 Software Developer’s Kit. References on tabs in the Osprey Driver relate to terms used by Microsoft’s streaming video software application. They exist for users with a high degree of technical expertise. You can simply ignore them and use the property tabs as discussed in this manual.

Input tab

The source of data an Osprey AVStream card outputs to the Internet, can come from a number of devices such as DVD players, digital cameras, camcorders, and so forth. The Input tab (Figure 7) has three sections: Video Input, Video Standard, and Input Format. The Video Input control performs the same function as a crossbar filter attached to the capture filter's Analog Video In pin.

Figure 7. Input tab



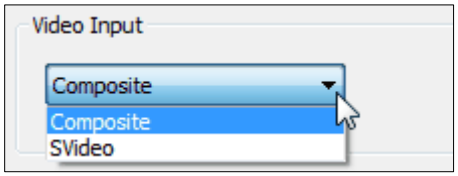
The Input tab has the following controls.

Video Input	This control allows you to choose your video signal source.
Video Present	This indicator shows if the video source is present.
Video Standard	The Video Standard control allows you to select a standard used in specific countries or geographical areas.
Input Format	This control lets you select the input format. On the Osprey 2X0, and 440 analog cards, and for the Osprey 530 when an analog input (composite or S-Video) is selected, the controls provide adjustments.
VideoCheck	Opens simple video monitoring window so you can see the immediate effect of changes to your settings.
VideoGraph	Launches a vectorscope/lumascope utility
VbiGraph	Opens an applet that displays the raw waveforms of the video's Vertical Blanking Interval (VBI).

Video Input

Figure 8 illustrates the input formats available for the Osprey 230.

Figure 8. Video inputs available with Osprey 230



Composite video is the format of analog streaming signals before it is combined with a sound signal and modulated onto an RF carrier.

Composite video is often designated by the CVBS acronym, meaning: Color, Video, Blank and Sync, Composite Video Baseband Signal, Composite Video Burst Signal, or Composite Video with Burst and Sync.

Separate video, abbreviated SVideo and also known as Y/C is an analog video signal that carries the video data as two separate signals. They include luma (~brightness) and chroma (~color).

The Osprey 5X0 series has the following video inputs:

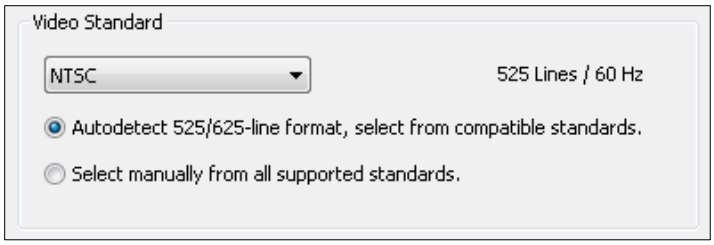
- Composite
- SVideo
- SDI

The Serial Digital Interface (SDI), standardized is a digital video interface used for broadcast-grade video and is available on the Osprey 530.

Video Standard

Osprey cards can stream country centric data to the Internet. The Video Standard control allows you to select a standard used in specific countries or geographical areas. The Osprey driver has the ability to stream in a number of formats unique to countries and, or geographic locations. You can change the format on the Osprey card.

Figure 9. Video Standard


Video Standard
NTSC
525 Lines / 60 Hz
Autodetect 525/625-line format, select from compatible standards.
Select manually from all supported standards.

The Video Standard control group lets you select which video standard to use. The supported video standards are as follows:

- NTSC is the North American standard – a 525-line, 29.97 Hz frame format.
- NTSC-Japan is the same as North American NTSC except for a slightly different luma calibration.
- The PAL standards, B, D, G, H, and I are similar, and are treated the same by the Osprey driver. These standards are 625-line, 50 Hz formats.
- PAL-N is the Argentine PAL standard with a 3.58 MHz color subcarrier. This standard is a 625-line, 50 Hz format.
- PAL-M is the Brazilian PAL standard that combines the PAL method of color encoding with an NTSC-type 525-line, 29.97 Hz frame format.
- SECAM is a 625-line, 50 Hz standard originated in France and used in a number of other countries.

You need ensure the video standard in this control group is the same as the actual signal format on the selected input. If these two are mismatched, you will either get color streaks and fringes instead of correct color, or completely garbled video, or perhaps only a test pattern.

Starting in spring 2012, some versions of the driver may include an auto-select capability. If the driver has this capability, the two buttons **Auto detect** and **Select manually** display (Figure 9); otherwise, this area is blank. It is not currently planned for the Osprey 5x0 to have this capability.

For drivers that support Autoselect, the buttons turn auto-select off and on. The default is for auto-select to be disabled.

When you choose **Select manually**, operation is the same as with drivers that do not have the auto-select capability. You must to ensure the video standard in this control group corresponds to the actual incoming signal format.

When you choose **Autodetect**, the driver determines whether the video feed is presenting a 525-line or 625-line standard, and configures video capture for that line format. If the input is switched to the other line format while capture is running, the driver will detect this and automatically reconfigure for the new format.

Although the driver can distinguish between 525-line and 625-line video, it does not distinguish between color standards within the 525-line and 625-line groups. That is, it does not distinguish between the three 525-line standards – NTSC, NTSC-Japan and PAL-M – and it does not distinguish between the three 625-line standards – PAL-BDGHI, PAL-N and SECAM. The selection box therefore shows the group of standards that are compatible with the current line format. The driver remembers your most recent 525-line selection, and separately remembers your most recent 625-line selection, and these two standards are the ones that will automatically be switched between when the line format changes in the future. The default 525-line standard is NTSC and the default 625-line standard is PAL-BDGHI.

When no video signal is present, or if the driver cannot determine the standard of the input signal, the selection box will say **[unrecognized]**.

The basic video standard selection control is separate for each Osprey board or capture channel. The auto-select buttons globally affect all boards of the currently selected type.

Changes to these controls take effect as soon as you click **Apply** or **OK**.

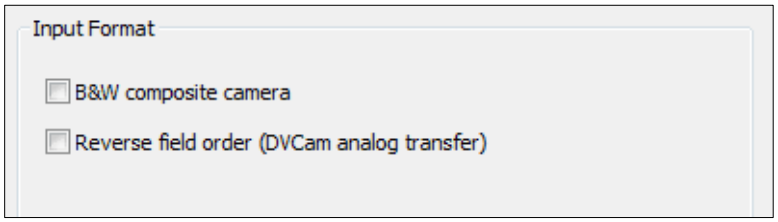
Note: When you change from a 525-line standard to a 625-line standard – whether under automatic or manual control – you may need to adjust your frame size for best results. The driver does not do this automatically. The latest driver attempts to give you usable video in all cases. For example, when Post-Processing mode is enabled, if you have running PAL video at 768 x 576 output resolution, and you switch to NSTC video, the driver will stretch the NTSC video to 768 x 576. The preferred, unstretched size of NTSC video is 640 x 480 and you may want to set this size as a separate step. Older versions of the driver, and the current driver when you enable Direct Mode, cannot do this stretch, and video cannot be run until you adjust the output size.

A related point is, if you were previously running at the full PAL frame rate of 25 fps, when switching to NSTC you also need to adjust the video rate to NTSC's full native rate of 29.97 fps. The driver does not do this automatically.

Input Format

Below the Video Standard field are two check boxes for input formats (Figure 10).

Figure 10. Input Format



On the Osprey 2X0 and 440 analog cards, and for the Osprey 530 when an analog input (composite or S-Video) is selected, the controls provide adjustments.

B&W composite camera (Figure 11) - This check box improves the clarity of video from monochrome sources. This check box is only enabled when a composite input line is selected; otherwise it is grayed and the control has no effect. When a composite input line is selected, and a monochrome device is attached, this check box should be checked – the result will be a sharper image, as shown in the "notch kill" item of the image pair below. If a device that has color capability is used, this check box should be unchecked, or else the image will be textured and unstable.

Note: This control is only for true monochrome devices, without color capability. For example if you are looking at a DVD of a black and white film, this check box should not be checked because a DVD player has color capability. If this control is checked with a color source, the image will appear shimmering and unstable.

Figure 11. Black and white composite camera

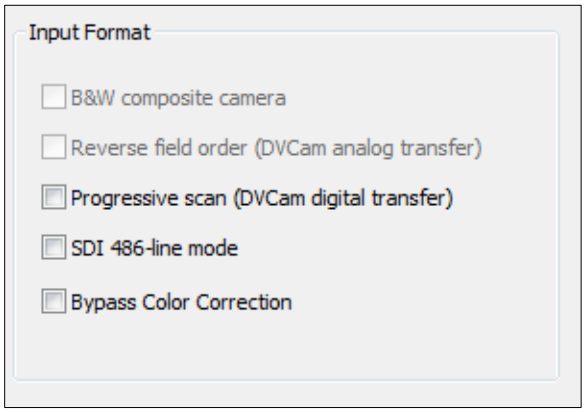
Reverse field order(Figure 11) - This control is provided on the Osprey 2X0 and 440 analog cards, and for the Osprey-5X0 when an analog input (composite or SVideo) is selected.

This control might be useful if you are capturing video from a digital camera, and routing through the Osprey card's analog composite or s-video input. The normal field pairing order for NTSC cameras is Odd-Even. However, some progressive video cameras and video footage that originated on film may have a different field dominance that requires pairing of even/odd fields into frames. If you notice that there are problems with interlaced video such as "comb" effects where alternate lines are reversed, the Reverse Field Order setting might clear up the problem.

Digital inputs (Osprey 5x0 only)

The Osprey-5X0 controls for analog inputs are the same as for the analog cards, as well as:

Figure 12. Digital input formats



When a digital input (SDI or DV (1394)) is selected, the analog controls are grayed and three controls relevant to digital inputs are enabled.

Note: The Osprey 530 has the SDI input but no DV input.

Progressive scan

In normal video, including many digital cameras, field 1 containing lines 1, 3, 5… of the video is transmitted in its entirety followed by field 2 containing lines 2, 4, 6…. The capture card interleaves the two fields together, and the progressive scan setting should be turned off. A digital camera, however, may transfer data in progressive mode, meaning that the data is transferred as a single field of lines 1, 2, 3, 4, 5…. You will know that you need to use the Progressive Scan setting if the video displays as two separate half-height fields, one on top of the other.

Changes to this control take effect only when all video streams are stopped and restarted. All streams must be stopped before any are restarted.

SDI 486-line mode

This control is important and will be needed with many NTSC SDI setups. The NTSC standard provides 485 lines of video. The lines appear to a video capture device as interleaved from two fields, with 243 lines from field 1 and 242 lines from field 2. The standard line order is as follows:

- Line 21 Closed Captioning channels 1 and 2
- Line 284 XDS (extended data services (v-chip)) and CC channels 3 and 4
- Line 22 Sometimes, ancillary data
- Line 285 Sometimes, ancillary data
- Line 23 Video (occasionally, ancillary data)
- Line 286 Video (occasionally, ancillary data)
- Video

- Line 263 Last line of video, field 1
- Line 525 Last line of video, field 2

SDI sources may add a 486th line, which will be line 283 at the top of the above list, before line 21. This reverses the apparent field order as seen by the Osprey-5X0, and alters the lines on which captioning data will appear.

Check the SDI 486-line control:

1. If you do not see closed captions with CC1 enabled, or see spurious incorrect captions.

2. If you do see CC1 captions correctly when the CC3 caption channel is selected.

3. If no XDS data can be decoded from a source that is known to have XDS data.

4. If, using a broadcast source, on the RefSize page, having selected "Start Video at Lines 23/286", you see a single line of ancillary data (line 285) at the top of the screen.

This control is mainly for use with SDI sources but it is enabled with DV sources as well. Therefore, if you are using a 486-line SDI source along with a 485- or 480-line DV source, you will have to manually change this line each time you switch between these inputs. 486-line mode is automatically inhibited for the analog inputs – composite and SVideo – so you do not have to switch it off when you select one of these inputs.

Bypass Color Correction

When a digital video input is selected (SDI or DV), a check box entitled **Bypass Color Correction** is enabled. When this box is checked, no Video Proc Amp adjustments are made; factory default values for Brightness, Contrast, Hue, Saturation, Sharpness, and Gamma are used, and the Proc Amp functions in a pure pass-through mode. All controls on the Video Proc Amp page are disabled. The Video Proc Amp controls become enabled or disabled only when **Apply** is clicked on the Input page.

Bypass mode is for use when Proc Amp adjustments are made by external equipment upstream of the Osprey card. In this mode, video may not appear correct or natural unless external Proc Amp corrections are made.

VideoCheck

VideoCheck opens a simple video monitoring window (Figure 13). You can see the immediate effect of changes to your settings. Most changes show up automatically as soon as you click **Apply**. You will need to click the applet's **Update** button to see a change that alters the output size of the video.

VideoCheck uses one preview stream of video. If you do not have SimulStream installed, you can only view one preview stream at a time from each device (this is in addition to the main capture stream). If VideoCheck does not work, the first thing to check is whether a preview stream is already running on the device.

Figure 13. VideoCheck utility

VideoGraph

The VideoGraph utility (Figure 14) launches a vectorscope/lumascope utility. VideoGraph is intended to be used with a color bar signal from a calibrated signal generator. It shows whether the signal and the card's Video Proc Amp settings are calibrated to the correct luma and chroma levels.

In the picture, the left-hand panel shows the luma levels of standard 75 % NTSC color bars. The grey background shows the expected levels, and the red line shows the actual levels measured. The right-hand panel shows the chroma positions of the six colors. The small colored squares show the expected positions, and the points on the red signal pattern should line up with them.

If there are discrepancies, you can use the driver's Brightness, Contrast, Saturation, and Hue controls on the Video Proc Amp property page to adjust the levels.

If you don't have a signal generator available, you can get a general idea of how VideoGraph works by disconnecting the input signal and running it with the 75 % or 100 % no-signal color bar test pattern. The driver's test pattern will line up exactly with the VideoGraph's targets – IF the gamma setting is at the default position. Software-based Video Proc Amp controls alter the test pattern levels; hardware based-controls do not. The gamma control, and in some cases the hue control, are software based.

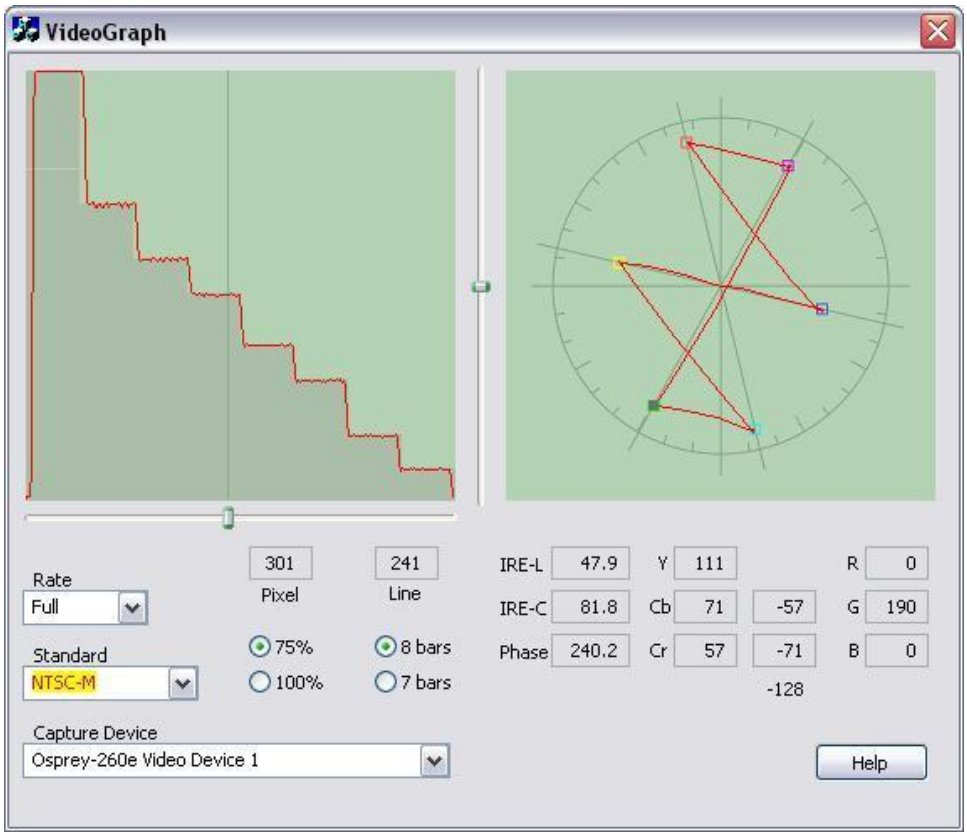
The vertical slider adjusts which video line displays. You may have to move the slider so that a line that has color bar information is selected.

The horizontal slider moves the horizontal cursor – the vertical line on the luma display. The data displayed at the lower right – IRE-L, etc. – is for the pixel selected by the horizontal cursor. Also, on the chroma display, the small solid rectangular cursor corresponds to the luma cursor, that is, if the luma cursor is on the red color bar, the chroma cursor will be at or near the red point in the chroma display.

There are controls to set the background markings for 75 % or 100 % signal levels, and for eight or seven bars – so that the markings correspond to the type of color bars your signal generator is making.

The Help button on the applet brings up a message box with an alternate and slightly more technical description.

Figure 14. VideoGraph utility

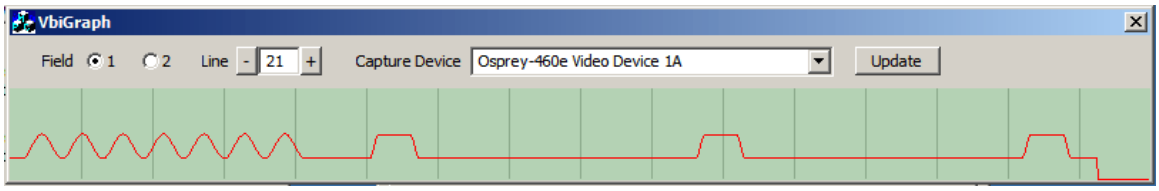


VbiGraph

The VbiGraph utility (Figure 15) opens an applet that displays the raw waveforms of the video's Vertical Blanking Interval (VBI). The information on these lines may include closed captions (CC), wide screen signaling (WSS), vertical interval timecode (VITC), and teletext. The applet is useful as a diagnostic if the expected data is not being decoded – you can see if the required signal is there at all, whether it is in spec, and which line it is on.

The controls select the field and line to be displayed. The only time you need the **Update** button is when you switch between 525-line and 625-line video standards.

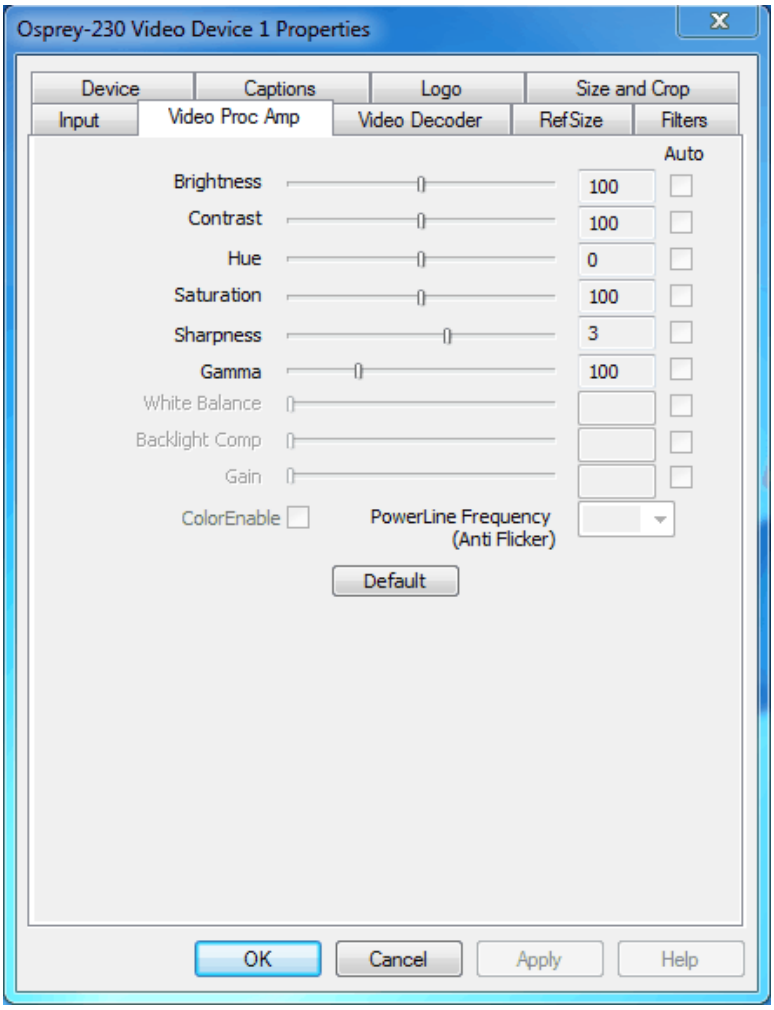
Figure 15. VbiGraph utility



Video Proc Amp tab

Video Proc Amp stands for Video Process Amplifier. The Video Proc Amp tab (Figure 16) controls various characteristics of streaming output from Osprey cards.

Figure 16. Video Proc Amp tab



Slider controls let you adjust brightness, contrast, hue, saturation, sharpness and gamma. If you're using the preview or capture mode in real-time, then you can see your adjustments as you make them with the Video Proc Amp controls. If preview or capture-to-screen video is running when you access this page, you can see your adjustments interactively.

The Video Proc Amp tab has the following controls.

Brightness and Contrast	These are terms for what one would call a contrast ratio. It's a measure of a display system, defined as the ratio of the brightest color (white) to that of the darkest color (black) that the system is capable of producing. A high contrast ratio is a desired aspect of any display, but with the various methods of measurement for a system or its part, different measured values can sometimes produce similar results. The control exists in the event you need to change the ratio of an incoming signal.
Hue	Hue adjustment only functions for NTSC video.
Saturation	In color theory, saturation or purity refers to the intensity of a specific hue. A highly saturated hue has a vivid, intense color, while a less saturated hue appears more muted and grey. With no saturation at all, the hue becomes a shade of grey. You are able to adjust the saturation level in the event it is altered by a video feed.
Sharpness	This slider has six positions corresponding to six hardware filter settings. Generally, the positions to the left result in smoother video, the positions to the right result in sharper video. Since each step engages a different combination of discrete filters, some steps may result in slight differences while other steps may result in large differences.
Gamma	You would rarely use this control; however, a need may arise for its use. In the simplest terms the input of a feed from a device into your card may not match the digital output on your screen. The gamma control allows you to balance the red, blue and green from the input to output within the normal range of people's perceptions.
White Balance	This field is an unused DirectShow feature and is not selectable.
Backlight Comp	This field is an unused DirectShow feature and is not selectable.
Gain	This field is an unused DirectShow feature and is not selectable.
Auto	This field is an unused DirectShow feature and is not selectable.
ColorEnable	This field is an unused DirectShow feature and is not selectable.
PowerLine Frequency (Anti Flicker)	This field is an unused DirectShow feature and is not selectable.
Default	Click **Default** to return to the default settings.
OK	Click **OK** to accept the settings.
Cancel	Click **Cancel** to close the window.
Apply	Click **Apply** to apply the settings.
Help	The **Help** button is not in use.

If you use different inputs on the Osprey 530 you may want to adjust each input individually. If you can pause you video device, you can see the effects of different sharpness settings as you adjust the video.

- For all of the Video Proc Amp controls the driver maintains one set of settings per Osprey device. It does not maintain individual settings for each input or type of input.
- Changes made on this page apply to all video previews and capture properties on the currently selected device.
- Change the video standard or video input and you will not see changes in the slider controls – such as the Hue button becoming disabled – until the driver properties dialog is closed and re-entered.

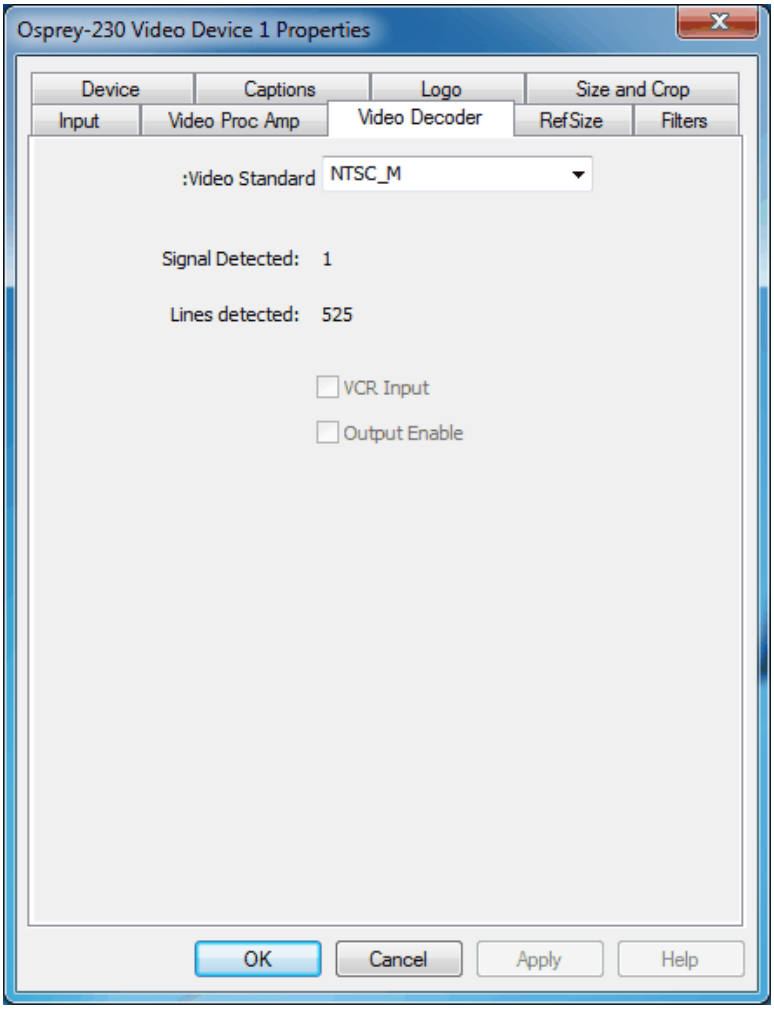
Osprey 5x0 note: When a digital video input is selected and the check box Bypass Color Correction on the Input tab is checked, all of the Brightness, Contrast, Hue, Saturation, Sharpness, and Gamma sliders are disabled. The Proc Amp uses default settings and operates in a pass-through mode for all these controls. This mode is for use when Proc Amp adjustments are made by external equipment upstream of the Osprey card. In this mode, video may not appear correct or natural unless external Proc Amp corrections are made.

On the Osprey 5x0, the driver cannot decode Closed Captions when brightness or contrast are set at extreme values. This will only be a problem when they are set to such extremes that normal video will not be viewable.

Video Decoder tab

The Video Decoder tab (Figure 17) is a Microsoft DirectShow control for setting the NTSC/PAL/SECAM video standards. PAL and SECAM are standards used in Europe and other parts of the world. Osprey cards can function in computers in various countries with different standards. These controls are also on the Input tab. Most users will find the Input tab more convenient.

Figure 17. Video Decoder tab



Changes apply to all video previews and stream captures on the currently selected device. If you have multiple Osprey cards, you can set the input individually for each of them. Changes made with this control take effect immediately. If video is running and a standard is selected that does not match the incoming signal, the video is likely to freeze or glitch until the signal matches the correct standard.

Osprey boards support the “Signal Detect” (0 or 1) and “Lines Detected” (525 or 625) status readouts. They do not support the VCR Input or Output Enabled controls, which will always be disabled.

Note: The Video Standard drop-down list displays more detail than the Video Standard drop-down list on the Input tab. For example, the drop-down list on the Video Decoder tab displays the different variations of SECAM for this driver. The Input tab, however, refers to all SECAM variations as SECAM, which is correct from the point of view of the Osprey card.

The Video Decoder tab has the following controls.

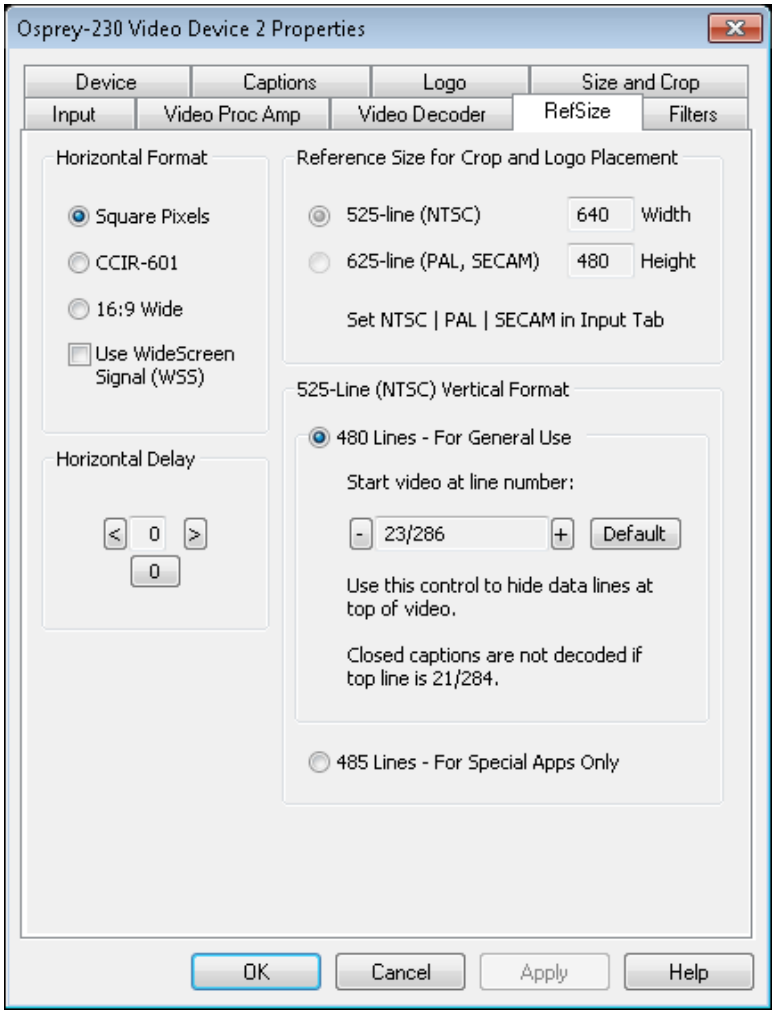
Video Standard	Select the video standard
Signal Detected	When the card does not detect the input signal, this field displays a 0. When the card detects the input signal, it displays 1.
Lines detected	This field displays the number of lines the card detects in the input signal.
VCR Input	This field is an unused DirectShow feature and is not selectable.
Output Enable	This field is an unused DirectShow feature and is not selectable.

RefSize tab

Change made to the RefSize tab (Figure 18) apply to all video previews and captures on the currently selected device. The tab controls features related to the reference size, format, and proportions of the video. You will rarely use these controls. Most users can set up this page once and not refer to it again.

Note: This page does not provide everyday control of the final output size of your video. Control final output size either from your application, from the Crop tab, or from Property dialogs described in a later section.

Figure 18. RefSize tab

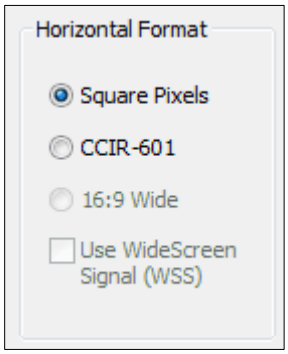


The RefSize tab has the following controls.

Horizontal Format	Set the horizontal mode for the output. Options include Square Pixels, CCIR-601 setting, 16:9 Wide, and Use WideScreen Signal control.
Horizontal Delay	The horizontal delay control moves the video horizontally in the capture or preview frame.
Source Width	Use the Source Width control can be used to trim the black left and right edges of an image.
Reference Size for Crop and Logo Placement	This part of the dialog box displays the results of more fundamental settings made elsewhere in the dialog box.
525-Line (NTSC) Vertical Format	This control is for NTSC users. It has no effect for PAL and SECAM 625-line video standards.

Horizontal Format

Figure 19. Horizontal Format



Square Pixels - This setting is for normal 4:3 video that will be viewed via a computer monitor. This setting results in a square aspect ratio sampling of the source video and a source image of 640 x 480 for 525-line standards and 768 x 576 for 625-line standards.

CCIR-601 – This setting is for 4:3 video that will be viewed on a dedicated video monitor. This setting results in a CCIR-601 aspect ratio sampling of the source video. It results in a video input horizontal size of 720 pixels for both 525-line and 625-line standards. This sizing is standard for dedicated monitors but results in video that appears horizontally stretched (525-line) or squeezed (625-line) on a computer monitor.

It is more efficient to set the horizontal mode to match the size of the output. For example, if your target video size is 640 x 480, using Square Pixel sizing in PostProcessing Mode will avoid any unnecessary software scaling step in the driver.

16:9 Wide – This setting is for 1.85:1 anamorphic video such as DVD content and PAL widescreen content. The output video size will be 852 x 480 for 525-line standards, and 1024 x 576 for 625-line standards. In order to actually see output of this size, you have to also select this size in your application.

Use WideScreen Signal (WSS) – This setting enables automatic sidebars and letterboxing when the input video aspect ratio does not match the output aspect ratio. If the aspect ratio of your content is subject to changing between 16:9 and 4:3, it will be useful to the enable this control.

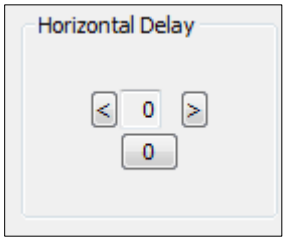
WSS is a line of the vertical blanking interval (VBI) that encodes the aspect ratio of the video. It is normally line 20 of 525-line video and line 22 of 625-line video. It is generated by newer DVD players, and in present in PAL broadcast content.

The Use WideScreen Signal (WSS) control is useful for both 4:3 and 16:9 input formats, and for both 4:3 and 16:9 output formats. When selected, it has the following effects:

- 4:3 video on a 4:3 window shows without sidebars or letterboxing
- 4:3 video on a 16:9 window shows with sidebars
- 16:9 video on a 16:9 window shows without sidebars or letterboxing
- 16:9 video on a 4:3 window shows with letterboxing.

Horizontal Delay

Figure 20. Horizontal Delay

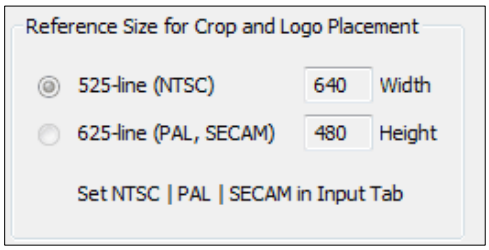


The Horizontal Delay control moves the video horizontally in the capture or preview frame. Video devices differ in their timing characteristics, so some devices may need different adjustments from other devices. Adjust this control if you are seeing a black line to the left or right of the video. Use the left and right arrow buttons to move the video to the left or right. Click [0] to restore the default zero setting. The allowed range is -15 to 15. With uncropped video, the video will shift only on every second increment 0, 2, 4….

Reference Size for Crop and Logo Placement

These fields are read-only because you do not set it directly – rather, it shows the results of more fundamental settings made elsewhere in the dialog box.

Figure 21. Reference Size for Crop and Logo Placement



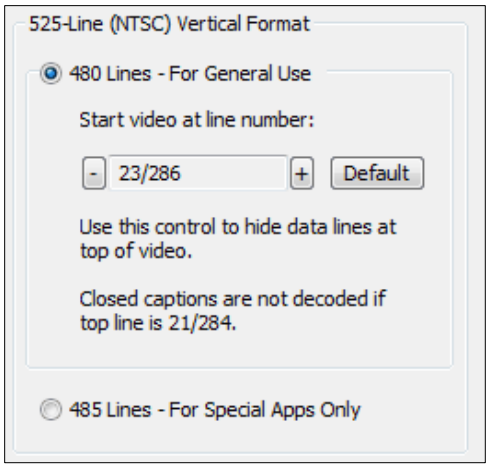
The settings shown by the 525-line / 625-line buttons reflects the video standard selected in the Input or Video Decoder tab. NTSC formats result in 525-line, 29.97 frame per second video. PAL (other than -M) and SECAM formats result in 625-line, 25 frame per second video.

The Height and Width boxes show the size of the incoming video based on all the settings you have made. In particular, they reflect the video standard (NTSC, PAL, or SECAM) that you have selected on the Input Property Page, and the setting in the adjacent Horizontal Format group.

525-Line (NTSC) Vertical Format

This control is only meaningful for NTSC users. It has no effect for PAL and SECAM 625-line video standards.

Figure 22. 525-Line (NTSC) Vertical Format


525-Line (NTSC) Vertical Format
480 Lines - For General Use
Start video at line number:
23/286
Default
Use this control to hide data lines at top of video.
Closed captions are not decoded if top line is 21/284.
485 Lines - For Special Apps Only

Select 480-lines for all normal applications. Select 485-line video for specialized applications.

When you select 480-line, you can select which of three video lines should be the top line of displayed or captured video. Lines 21 and 284 are used for Closed Caption in films and broadcast video. Lines 22 and 285 are sometimes used for ancillary data in broadcast video. If these lines are used for data, they will appear as moving bands or streaks across the top lines. Therefore, the most

generally useful start lines are 23 / 286. For cameras and some packaged content, however, all video lines starting with 21 / 284 can be part of the displayed video.

Some broadcast video also uses additional top line pairs for ancillary data. We are seeing cases where the top line has to be set to lines 26 / 289 in order to hide all the data lines.

You can set start lines all the way up to 27 / 290. (On the PCI products which have a Direct Mode option, PostProcessing Mode must be set in order to have top lines below 23 / 286.)

When the start lines are below 23 / 286, the bottom of the video frame spills off the bottom of the 485-line NTSC-standard frame. In this case the driver adds black lines at the bottom of the frame.

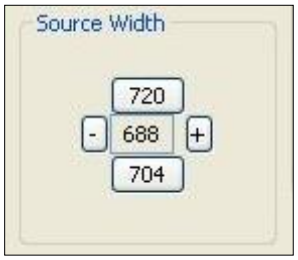
Note: If you select start line 21 / 284, Closed Captions cannot be decoded. On the Osprey-240e/450e, CC cannot be decoded if the start lines are 22 / 285 as well as 21 / 284.

Source Width

This control is available only on the Osprey 240e/450e and Osprey 5x0 series boards.

The Source Width control (Figure 23) can be used to trim the black left and right edges of an image. This control is only available for NTSC video, and only when the Horizontal Format is set to Square Pixels such that the reference size is 640 x 480.

Figure 23. Source Width



The suggested procedure is as follows:

1. With video preview running, click 720 to display the entire image, which will usually include black left and right edges. Changes will appear interactively.

2. Use the Horizontal Delay control immediately above this control to center the image so that the black edges are of equal width.

3. Click 704 to trim the image to the nominal borderless width.

4. Click + and - to adjust the trimmed size so that the black edges are completely removed but no active video is lost. The allowed range is 688 to 720.

It is possible to obtain the same result using the cropping control (Size and Crop tab) but there are some differences.

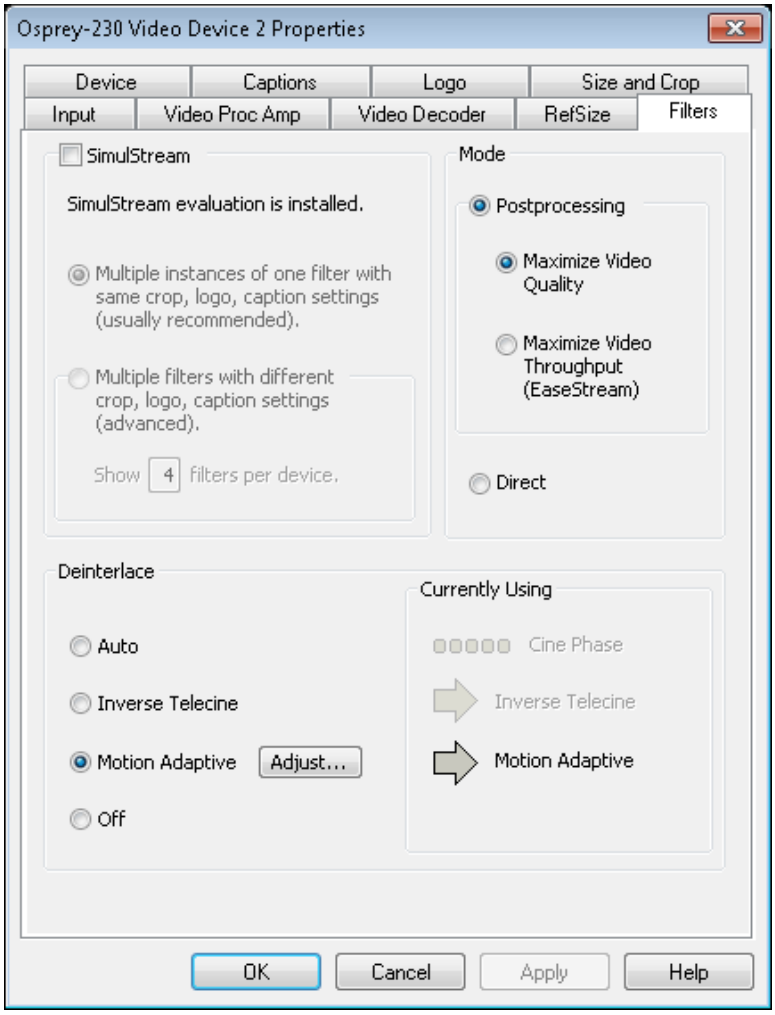
1. The Source Width control affects all pins and all filters on the device, whereas the crop control would have to be set separately for all SimulStream filters.

2. In PostProcessing Mode this operation is often more efficient in terms of processing than a crop operation. The crop and scale are done in hardware, so if you are using the resultant 640 x 480 image directly without further cropping there is no scale/crop processing cost incurred.

Filters tab

The Filters tab (Figure 24) covers two independent technologies: SimulStream and Deinterlacing. Functionality for both technologies exists on the filter tab.

Figure 24. Filters tab



From a practical point of view, filters have two interrelated purposes:

- They allow applications to enumerate and list DirectShow video capture and preview pins or streams (each with different settings) as named entries in their video device select list. You can set up the driver to show 1 to 10 filters per device. Each filter has one preview pin and one capture pin. Standard applications can access a particular filter without any custom programming specialized for Osprey devices.
- Each filter has independent settings for cropping, default output size, logos, and captions that can be stored between sessions. Compared to the previous pin-based method, there are no requirements for a particular startup order, in order to associate settings with instantiations.

The Filters tab has the following controls.

SimulStream	Enables SimulStream. SimulStream provides technology so a single capture card can output the same video in different sizes, color formats, frame rates, crops, logos, and captioning.
Mode	The Mode group selects the two main functional modes of the driver – PostProcessing Mode and Direct Mode – as well as the Quality/Throughput tradeoff for PostProcessing Mode.
Direct	When Direct mode is selected, processing by the driver is minimized. The processing steps named above – deinterlace/inverse telecine, gamma, logo, and caption rendering – are not available.
Deinterlace	Deinterlace settings are applied and stored per-device and are applied to all filters and pins associated with a device.
Currently Using	These indicators allow you to see the current algorithm.

SimulStream

SimulStream is a purchased software option. It makes a single hardware device appear as several separate devices capturing the same input stream. You purchase SimulStream as an upgrade to your Osprey card or a pre-enabled card. Purchases can be made at www.ospreyvideo.com.

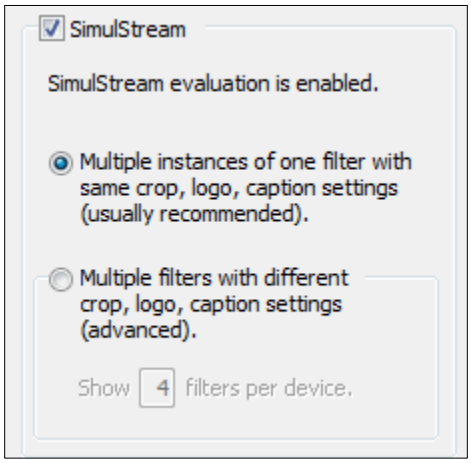
Osprey includes an evaluation version of SimulStream with the Osprey card; however, any logos or changes you attempt to make will not take effect until you purchase the SimulStream option. If you have a SimulStream license installed but have not turned on SimulStream, the text line at the top of the control group will say that SimulStream is **installed**. If you do have SimulStream turned on, the text will say that SimulStream is **enabled**.

You can have as many streams from the device as you want. Each stream can have different size, color format, frame rate, crop, logo, and captioning. You can have multiple video capture streams in a single application, or multiple applications each with one or more capture streams. The term “one filter” refers to the fact that all streams have the same Osprey custom properties. Specifically, cropping, logos (watermarks), and NTSC Closed Caption rendering settings must work the same for all streams on the device.

The advantage of this mode is that it is simpler. We recommend this mode if you don’t use Osprey custom cropping, logos or Closed Captions, or if all streams have the same settings. This setting affects all devices served by the currently accessed driver. The driver will advise you to restart the system or your application if this is needed.

You can see the caption **SimulStream evaluation is enabled** in Figure 25.

Figure 25. SimulStream evaluation is enabled


SimulStream
SimulStream evaluation is enabled.
Multiple instances of one filter with same crop, logo, caption settings (usually recommended).
Multiple filters with different crop, logo, caption settings (advanced).
Show 4 filters per device.

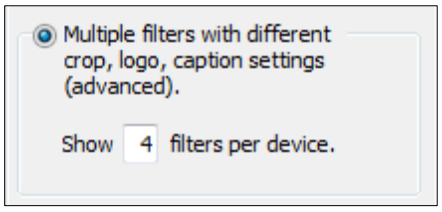
- Select the check box on the filter tab to enable SimulStream in the evaluation mode for the currently selected device, and specify how many filters you plan to expose.
- All the functions of SimulStream work in the evaluation mode except an evaluation logo displays on the video. If you set up a custom logo, the evaluation logo preempts it as long as evaluation mode is turned on.
- When SimulStream is installed the controls in this group affect the fully licensed SimulStream mode, as opposed to the free evaluation mode.

Multiple instances of each filter - This control enables you to run multiple instances on one device of applications that do not have device select controls. Leave this turned off unless you have a specific need for it. Turning it on will affect crop, logo, and caption settings. They will share a filter and not stand separate. Save the most recent crop, logo, or caption setting and overwrite settings that might have previously been saved from another application.

When you apply this change, a message box comes up asking to restart the system – this change will not work correctly until you do so.

Show N filters per device

Figure 26. Show filters



You can set up the driver to expose 1 to 10 filters per device (Figure 26). If, for example, 4 filters per device are chosen, the device list will show four entries for the current device. For device 1A, they are designated as 1.1, 1.2, 1.3, and 1.4.

When you apply this change, a message box comes up asking you to restart the system – it is important that you do so. The number of filters you have requested will not display or work correctly until the system is restarted.

Note: While it is possible to expose and enumerate up to 10 filters per device, the practical number of filters depends on your hardware. When video is being directly rendered to the screen, the video format and type of renderer used can make a major difference in system performance and in the number of streams that are possible. If multiple capture devices are in the system, the number of filters is the total across all the devices; in addition, some types of processing such as deinterlacing and gamma correction that are performed once per device may in this case occur multiple times. So, in summary, a high-end, multicore or multiprocessor system can support 5, 6, or more concurrent filters on one device if the processing per filter is light; but only 2 or 3 if the processing load inside or outside of the driver is particular heavy.

Multiple Filters - Use this mode if you are using Osprey custom cropping, logos (watermarks), and NTSC Closed Caption rendering, and want each stream to have separate settings for these items. This mode is definitely more complicated than the One Filter option just described – so only use it if you are sure you need it.

Note: You do not have to use this mode if the only things you want to be different on different streams are the video output size, color format, and/or frame rate. The application stores these settings, not the driver.

The term "multiple filters" refers to the method of saving and accessing these different settings. You can have 2 to 9 different filters, each holding different settings. The number of settings is determined by the edit box, **Show [4] filters per device**.

For example suppose you elect to have 4 filters per device, each with separate crop, logo, and caption settings. Let's say the underlying device has had the name **Osprey 230 Video Device 1**. With SimulStream enabled, when you open a list of capture devices, you will see **Osprey 230 Video Device 1.1**, **Osprey 230 Video Device 1.2**, and **…1.3** and **…1.4**.

To set the custom properties for one of these filter, select it from the device list and open the driver properties dialog. The title at the top of the dialog will confirm that you are setting up, for example, Osprey 230 Video Device 1.2. When you set crop, logo, and caption settings, these will be saved separately for Device 1.2 and will not affect Devices 1.1, 1.3, or 1.4. Settings that are not per-filter – such as Reference Size or the Video Proc Amp settings – will affect all filters on the underlying Osprey 230 Video Device 1.

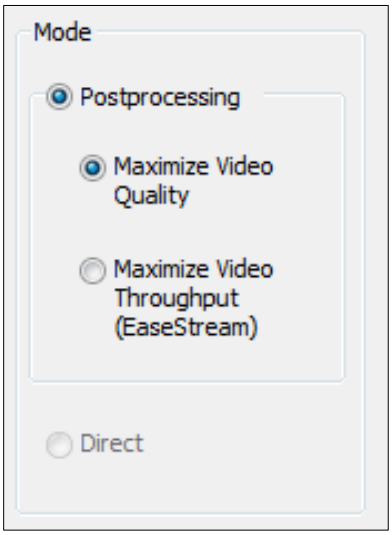
Later, whenever you select one of the four filters as your capture filter, the Osprey custom crop, logo, and caption settings previously set for that filter will be selected automatically.

You can have multiple streams on each filter. For example, you could have four streams consisting of two instances of Osprey 230 Video Device 1.1, and two instances of Osprey 230 Video Device 1.2. The first two instances will have filter 1.1's settings; the second two instances filter 1.2's settings.

This setting affects all devices served by the currently accessed driver. The driver will advise you to restart the system or your application if this is needed.

Mode

Figure 27. Mode



The Mode group (Figure 27) selects the two main functional modes of the driver – PostProcessing Mode and Direct Mode – as well as the Quality/Throughput tradeoff for PostProcessing Mode.

- PostProcessing - The following processing steps can be applied to the video:
  - *Deinterlace or inverse telecine*
  - *Gamma correction and software hue correction*
  - *Logo (watermark)*
  - *NTSC Closed Caption rendering*
- Deinterlace/inverse telecine and gamma/hue adjustment are applied to all filters on the device and must have the same settings for all filters.
- Crop, logo, and caption settings can be different for each pin of each filter, and the driver saves settings between sessions separately for each filter and pin.
- Video size, color format, and frame rate can also be different for each pin, but it is the responsibility of the application to save these settings.

Direct

When Direct mode is selected, processing by the driver is minimized. The processing steps named above – deinterlace/inverse telecine, gamma, logo, and caption rendering – are not available.

Maximize video quality

Use Maximize video quality for best quality when capturing full-frame video, It can be used for half-frame (CIF) video but does not offer any video quality advantage, and may use more processing resources.

Maximum video throughput

Use Maximum video throughput when capturing half-frame (CIF) video, or on very heavily loaded systems. Maximum video throughput mode cuts in half the amount of video Direct Memory Access (DMA) that is performed by the Osprey cards. It can be used for both full-frame and half-frame capture, but with full-frame capture there may be slight loss of video quality, and slightly more use of processing resources. Video quality impact may be undetectable in encoding applications regardless of source quality. Maximum video throughput is the default setting for the Osprey 440 because of the density of video DMA throughput that this card can generate.

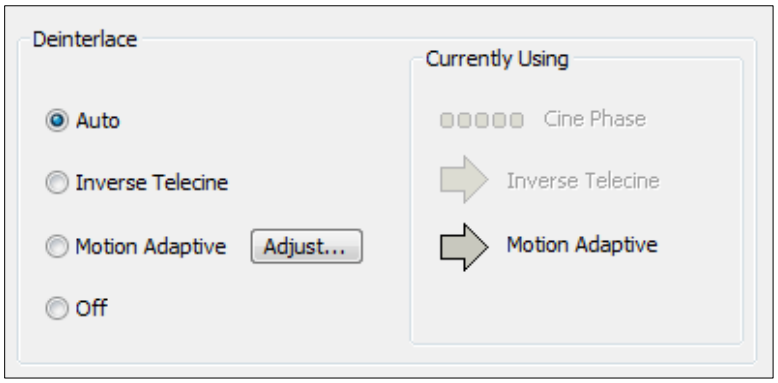
When SimulStream is enabled, PostProcessing is automatically turned on.

Changes to these controls take effect only when all video streams are stopped and restarted. All streams must be stopped before any are restarted.

Deinterlace

The deinterlace group has four radio buttons (Figure 28).

Figure 28. Deinterlace



Auto	Apply inverse telecine deinterlacing to all telecine video. Apply motion adaptive deinterlacing to all video that is not telecine. Switch dynamically between the two modes as the content changes. Available for NTSC video only.
Inverse Telecine	Apply inverse telecine deinterlacing to all telecine video. Perform no deinterlacing of video that is not telecine. Available for NTSC video only.
Motion Adaptive	Apply motion adaptive deinterlacing to all video. Click **Adjust** to adjust the parameters that control motion adaptive deinterlacing on the Adaptive Deinterlace window (Figure 30).

Off	Perform no deinterlacing of any kind

Deinterlace settings are applied and stored per-device and are applied to all filters and pins associated with a device.

Telecine video - NTSC video that was originally created on film at 24 frames per second. In the telecine conversion process certain fields are repeated in a regular, recurring sequence. If a telecined sequence is viewed directly on a progressive screen, interlacing artifacts will be visible.

Inverse Telecine (the reverse of Telecine) – It drops the redundant fields and reassembles the video in a 24 fps progressive format. Interlacing artifacts are 100% removed. If the video is viewed at 24 fps, you will see the exact timing and sequencing that was on the original film. If the video is viewed at 30 fps, every fifth frame will be repeated; however, there will be no deinterlacing artifacts.

Telecine and inverse telecine only apply to NTSC video. They are not used for PAL and SECAM video. The Auto and Inverse Telecine buttons will be disabled when PAL or SECAM is selected as the video standard.

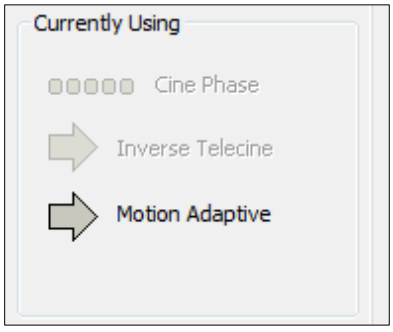
Motion adaptive deinterlace - An algorithm for deinterlacing pure video (non-telecine) content. It detects which portions of the image are still, and which portions are in motion, and applies different processing to each.

Currently Using

These indicators allow you to see the current algorithm. These are *not* control buttons – they are read-only indicators. They are mainly useful in Auto Mode, to indicate which algorithm – Inverse Telecine or Motion Adaptive – is currently being applied. They are also useful in Inverse Telecine mode to show whether telecine content is present and the Inverse Telecine algorithm is being applied.

The mode currently in use is marked by a green arrow (Figure 29). A mode that is possible under current control settings but not currently in use is marked by a dark grey arrow. A mode that is not available with the current control settings is marked by a pale outline arrow

Figure 29. Currently Using



With inverse telecine enabled, when telecine content is detected, the five Cine Phase dots show whether the 3:2 pull down sequence is shifting. If it is shifting, the green marker will shift. This will happen in mixed telecine/video content, and also in content that was converted to telecine and

then post-edited in the video domain. Whenever a shift happens, there will be a few frames that are not deinterlaced. If these shifts are frequent, you may have to switch to Motion Adaptive deinterlacing for consistent quality.

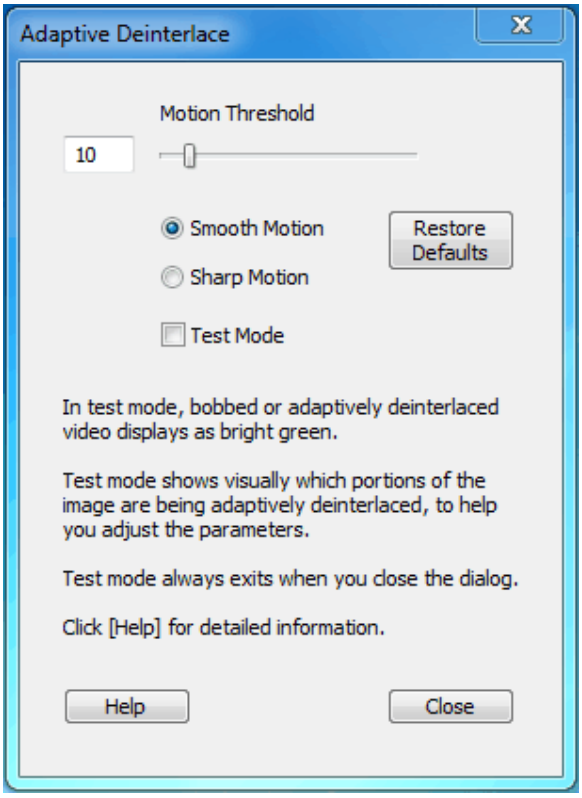
When the telecine detector locks the first time in a streaming session, the leftmost Cine Phase button will be green. If the telecine sequence is perfectly coherent, the phase will never shift. Once it does shift, the absolute phase of the Cine Phase display (which of buttons 1 through 5 is green) is not significant – the only significant fact is that phase shifts are occurring. When the sequence relocks, all phase buttons are equally correct.

Adjust dialog

Use the adjust dialog to adjust the parameters that control motion adaptive deinterlacing (Figure 30).

Note: When the driver is using the Inverse Telecine algorithm, either in Telecine mode or Auto mode, the Adjust settings have no effect at all, and Test Mode is inoperative.

Figure 30. Adaptive Deinterlace


Adaptive Deinterlace
Motion Threshold
10
Smooth Motion
Sharp Motion
Restore Defaults
Test Mode
In test mode, bobbed or adaptively deinterlaced video displays as bright green.
Test mode shows visually which portions of the image are being adaptively deinterlaced, to help you adjust the parameters.
Test mode always exits when you close the dialog.
Click [Help] for detailed information.
Help
Close

Motion Threshold	The Motion Threshold slider and edit box adjust the threshold of difference from spatially and temporally related pixels that is judged to be “motion.” If you enter Test Mode and move the slider to the right, the number of pixels that are considered in motion will be greatly reduced. As you move the slider to the left, the number of motion pixels will greatly increase until

	nearly the entire screen is considered in motion. The recommended default is 16.
Smooth and Sharp Motion	When the Smooth Motion radio button is selected, there will be more loss of detail in motion areas, but edges will be smoother. Since the eye does not see detail clearly in areas of motion anyway – whereas edge artifacts are always highly intrusive – the Smooth algorithm should be preferred for most applications. The Smooth algorithm uses a bit more CPU. When the Sharp Motion radio button is selected, detail in motion areas will be sharper, but at the expense of somewhat jagged diagonal edges. Both algorithms treat still areas (areas that are not green in Test Mode) the same way, and there should be no loss of detail in still areas.
Test Mode	When the Test Mode box is checked, the motion adaptive algorithm enters a test mode that displays motion pixels as bright green dots. The dots will mainly be along edges that are in motion, but if the motion threshold is set too high there may also be a random distribution of green dots caused by pixel jitter and instability of the video signal. The extensiveness of the green areas will vary according to the settings of the other adjust controls. Test mode is always automatically exited when you exit the Adjust dialog. In Test Mode, with the Sharp algorithm green speckles will be on alternate lines only, and with the Smooth algorithm they will be on all lines.
Restore Defaults	Click this button to restore the default settings.
Help	Click **Help** to access the user guide.
Close	Click **Close** to close the window.

Notes: If your video format results in exact 2:1 or 4:1 vertical scaling for a particular pin, then all the video will come from one field. This will be the case for uncropped NTSC CIF (320 x 240) or QCIF (160 x 120). It may be the case for special cases of cropped video as well.

In the PostProcessing sequence as currently implemented, the "sharp" motion adaptive deinterlacing algorithm has no effect on single-field streams, since it alters only the field that these streams do not use. The "smooth" algorithm operates on both fields and may have a detectable blurring effect on areas of motion. ("Sharp and "smooth" are set in the Adjusts sub dialog.)

Inverse telecine if enabled does not affect the individual fields for a one-field pin; however, if the pin's frame rate is 24, the driver will detect and remove the frames that are repeats. If you are streaming multiple pins, and the exact single-field special scaling case holds true for one pin but not another, different processing will be applied to the two pins.

When Auto mode is selected, some kinds of content will cause the driver to frequently switch between Inverse Telecine and Motion Adaptive processing. Content such as title sequences and commercials are often telecine, but cuts between scenes generally break the telecine sequence, forcing the driver to resynchronize. It takes it a number of frames to lock on to the new sequence. The driver will drop back to the Motion Adaptive algorithm as soon as it becomes aware that telecine sync has been lost. However, it may take it several frames to discover that this has happened; these frames will not be correctly deinterlaced.

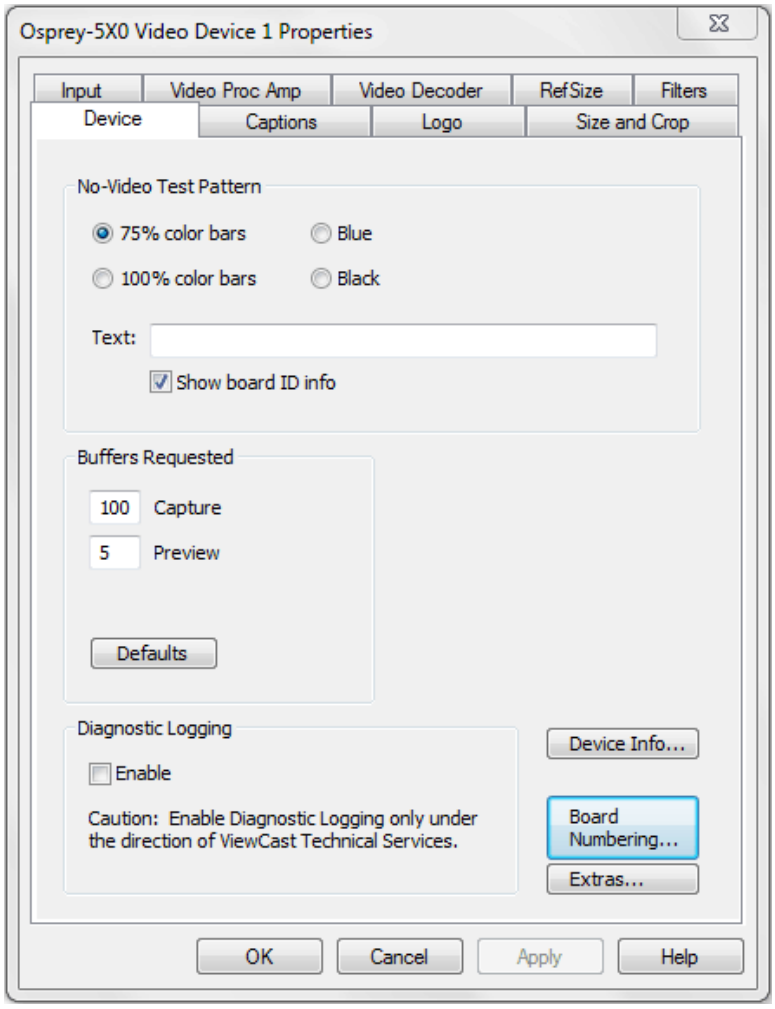
You should decide whether to use Auto, Inverse Telecine, or Motion Adaptive mode depending on the type of content you expect.

- If the content is consistently telecine, then either Auto or Inverse Telecine is recommended for perfect recovery of the original progressive format.
- If the content is telecine with post-detelecine video-based editing, Auto mode will result in the best overall quality – but there may be several frames that are not deinterlaced every time the pull down phase sequence has to be relocked.
- If the content format is a rapidly changing mix of telecine and video, or is all video, or is of unknown type, the Motion Adaptive setting will give the most consistent results. The quality of telecine sequences will not be the best possible, but there will be no instances of frames not deinterlaced at all due to telecine re-locking.

Device tab

The controls on the Device tab (Figure 31) are not used often. Unless specifically noted, changes made on this page apply to all filters and all video previews and capture pins on the currently selected device. Unless noted, different settings may be set and stored for different devices.

Figure 31. Device tab



The Device tab has the following controls.

No-Video Test Pattern	This control lets you select a pattern to display when no video signal is present.
Buffers Requested	The driver indicates the minimum number of video capture buffers needed to allocate for proper operation.
Diagnostic Logging	For use by Osprey Technical Support only.

Board Numbering…	This control lets you renumber the boards (see *Board numbering*).
Extras	Click this button to display the Extras dialog box (see *Extras*).
Device Info	Click this button to display the Device Info dialog box (see *Device Info*).

No Video Test Pattern

This group controls what to display when no video signal is present.

You can select one of four patterns – solid black, solid blue 75% color bars, and 100% color bars. The 75% color bars are calibrated to show correct luma and chroma test patterns on a vector scope. The calibrations are slightly different for NTSC and for PAL/SECAM.

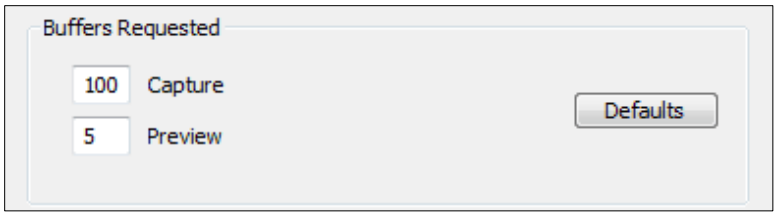
You can place a text line on the test pattern. If the Text edit box is empty - meaning *no* spaces and no text characters – then no text will display. Otherwise, whatever you type here, up to 32 characters, will display on the test pattern.

If you enable Show board info, the text display will include the device name, the currently selected video input, the PCI Express bus and slot number, and the board serial number. This display is useful for determining which physical board in the system corresponds to each device name.

Buffers Requested

The driver can tell DirectShow the minimum number of video capture buffers it needs to have allocated for proper operation (Figure 32). The client application may ask for a different number of buffers; in general DirectShow will honor the larger of the requests.

Figure 32. Buffers requested



Buffers are used in a round-robin style. The driver fills a buffer; the client then consumes the buffer, and releases it when it is done. The buffer then circulates back to the driver to be filled with video again. If the client holds on to a large number of buffers at once, there is the possibility that there will be no empty buffers available to the driver. The result will be dropped frames. The solution is to allocate a larger number of buffers.

Capture and encoding applications generally need a large number of buffers so that they can deeply pipeline the downstream processing without danger of buffer starvation at the driver. If there is evidence of buffer starvation, in the form of dropped frames, you can try increasing the number of buffers allocated for the Capture pin.

Preview video that is directly rendered on the screen does not use deep pipelining and cannot benefit from it. There has been some evidence that too many buffers for direct rendering can harm performance.

- On the Capture property, you can increase the number of buffers from the default 20 for deeper pipelining and more resistance to dropped frames.
- On the Capture property, you can reduce the number of buffers to around 5 if the video is going to be used only for direct rendering. Remember to put the number back to 20 or more for capture or encoding – 5 may not be enough and may result in many dropped frames.
- On the Preview property, you can increase the number of buffers to 20 or more if you are using it for capture or encoding rather than direct rendering.

Diagnostic Logging

If you have a problem and contact Osprey Support, they may request that you provide a diagnostic log from the system that is showing the problem. In this case, you would be directed to enable this control group. The driver will make a record of parameters and statistics from capture runs. These logs are written to the standard kernel driver debug stream, which can be captured and displayed by utilities such as DbgView. Osprey support will supply you with DbgView if you need it, or it is available from the Microsoft developers' website. The log is plain text but its interpretation is highly specialized. You would want to send it to Osprey where it will be reviewed by Osprey developers.

Enable Diagnostic Logging only when Osprey Technical Services specifically recommends it.

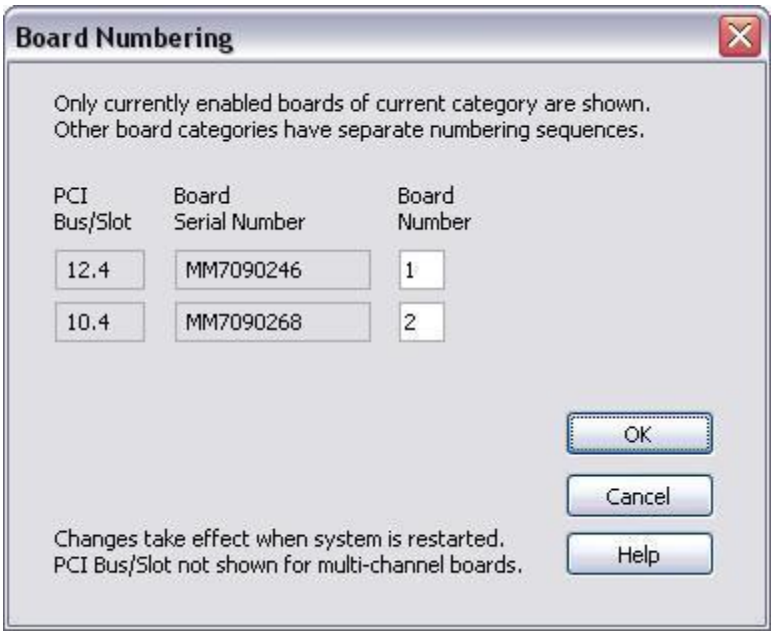
Board numbering

When a system with multiple Osprey boards is first set up, the device numbers reflect the order that the system identified and initialized the boards. The driver associates each device number with the PCI address of the board to which it is initially assigned, and saves that information. Each time you restart the system the same associations are preserved.

This initial ordering might not be the order you want. For example, in a system with four boards you may want the boards ordered 1-2-3-4 from left to right or top to bottom of the chassis.

Click **Board Numbering** on the Device tab to display the Board Numbering window (Figure 33) for renumbering the boards.

Figure 33. Board Numbering



Each line represents the information for one Osprey board. Only boards that are currently installed and enabled appear. Also, only boards of one type at a time appear. For example, consider a system with two Osprey 230e and two Osprey 440e boards. The two board types are numbered separately – there is a board 1 and a board 2 of each kind. Which listing is shown depends on the context in which you open the property pages. If you open them from an Osprey 230e context, you see the two Osprey 230e boards. If you open them from an Osprey 440e context, you see the two Osprey 440e boards.

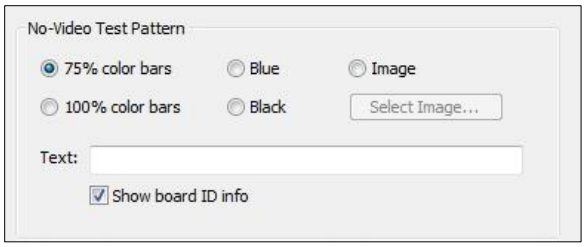
The information for each board includes the PCI bus and device address on the left, the serial number in the middle, and the current device number on the right. For boards such as the Osprey 440e which span multiple PCI addresses, the PCI Bus/Slot information does not display.

You can edit the device numbers. You can assign each board any number from 1 to 64. All boards in the current list must have different numbers. The numbers do not have to be in a packed sequence 1, 2, 3…

The easiest way to identify boards is to start all boards streaming, and remove the video sources so that test patterns display.

To set up the test patterns, enable the board ID information display by enabling **Show board ID** info on the Device tab (Figure 34).

Figure 34. Show board ID info field



The information shown includes the PCI bus and slot for the board, and the board's serial number, in the same format as the Board Numbering dialog.

When you have set the new board numbers and want to save them, click **OK**. The dialog warns you if the numbers are not in the allowed range 1 to 64, or if there are duplicates – you must correct these issues before saving the numbers and exiting. However, click **Cancel** at any time to exit, and your changes are discarded.

The new numbering takes effect when you restart the system.

Note: Board settings, especially video custom properties such as Crop, Logo, and Captions settings, are linked to board PCI addresses rather than to board numbers.

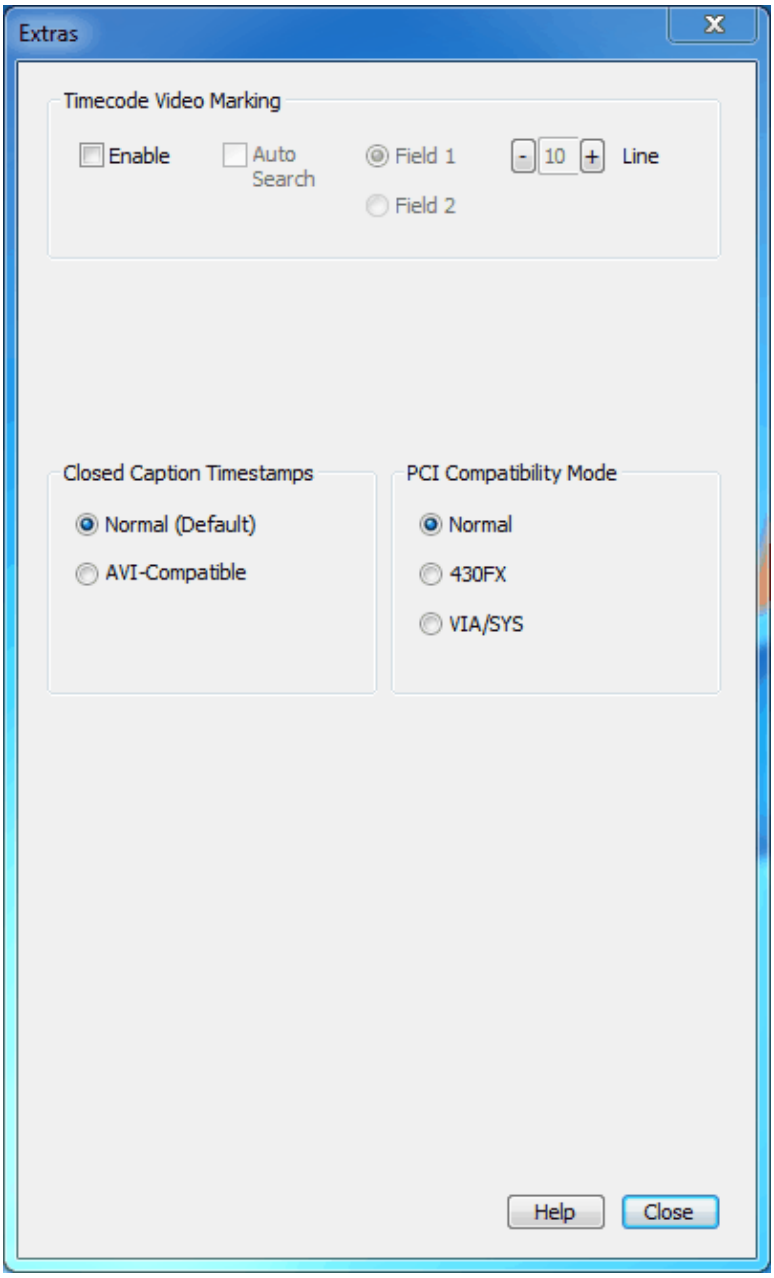
After you renumber boards, you may have to re-set your volume levels. On XP platforms, you may also have to re-select your audio inputs.

When you add a new board, especially a board with complex PCIe topology such as an Osprey 440e, the PCI addresses of boards already in the system may be altered. This may cause the driver to renumber boards already in the system. Use the Board Numbering window to set numbers the way you want. You may have to manually adjust board settings such as video custom properties when boards are added or removed.

Extras

Extras (Figure 35) are features of the AVStream driver that are new, not fully defined, or subject to change. Extras may also include workarounds to apparent DirectShow issues that are expected to be resolved fairly soon. Extras should be expected to change more frequently than other aspects of the driver.

Figure 35. Extras



The Extras dialog box has the following controls.

Timecode Video Marking	Refer to the *Vertical Interval Timecode (VITC)* section of this guide for more information.
Vbi Pin (Osprey 5x0 only)	The Osprey 5x0 boards do not provide full Vertical Blanking Interval (VBI) support, and do not normally expose a VBI pin. Windows Media Encoder 9, however, has a Closed Captioning scripting capability that requires a workaround. Although this application connects to the driver's Closed Caption Pin for delivery of actual Closed Caption data, it looks for VBI pin in its capability enumeration phase. This control directs the driver to expose a logically correct but non-functioning VBI pin so that the WME9 scripting capability can be used. We recommend hiding the VBI pin for other applications, since no valid VBI data will be delivered. Changes to this setting only take effect when you restart the device either with the system's Device Manager, or by rebooting the system.
Closed Caption Timestamping	This control is a workaround to a problem in DirectShow with capture of CC to AVI files. As a practical matter, always use the Normal setting.
Processor Assignment	This control is relevant only on machines with two or more processors, and with two or more Osprey devices of a particular class (Osprey 2x0, 300, 440, 5x0) installed. On single processor machines, this control is grayed. Leave this control set to the upper **usually recommended** button. There are a few machines where the alternative setup has helped. The symptom of a problem that might be helped by this setting is that processing is assigned unevenly among the processors. Changes made to this control will take effect when you restart the machine.
PCI Compatibility Mode	This control is relevant only to very old machines that have the indicated chipsets. You can try them if you are seeing drops of a significant amount of audio and/or video data. The change will take effect immediately.
Help	Click **Help** to access the user guide.
Close	Click **Close** to close the window.

Timecode Video Marking

Refer to the *Vertical Interval Timecode (VITC)* of this guide for more information.

Closed Caption Timestamps

This control performs a workaround for what we currently believe to be a problem in DirectShow with capture of CC to AVI files. If you attempt to capture a CC character pair stream along with a video stream to an AVI file with Normal timestamping, the file will become extremely large and the capture will fail within a few seconds. AVI-Compatible mode allows capture of CC to AVI.

Unfortunately, the problems with timestamping mean that time synchronization between the video and CC streams depends on their physical interleaving in the file, so that time synchronization will be quite poor; we do not have a workaround for this at this time. For all applications other than capture to AVI, this control should be set to Normal. WME9 among others requires the Normal setting if CC is used.

Device Info

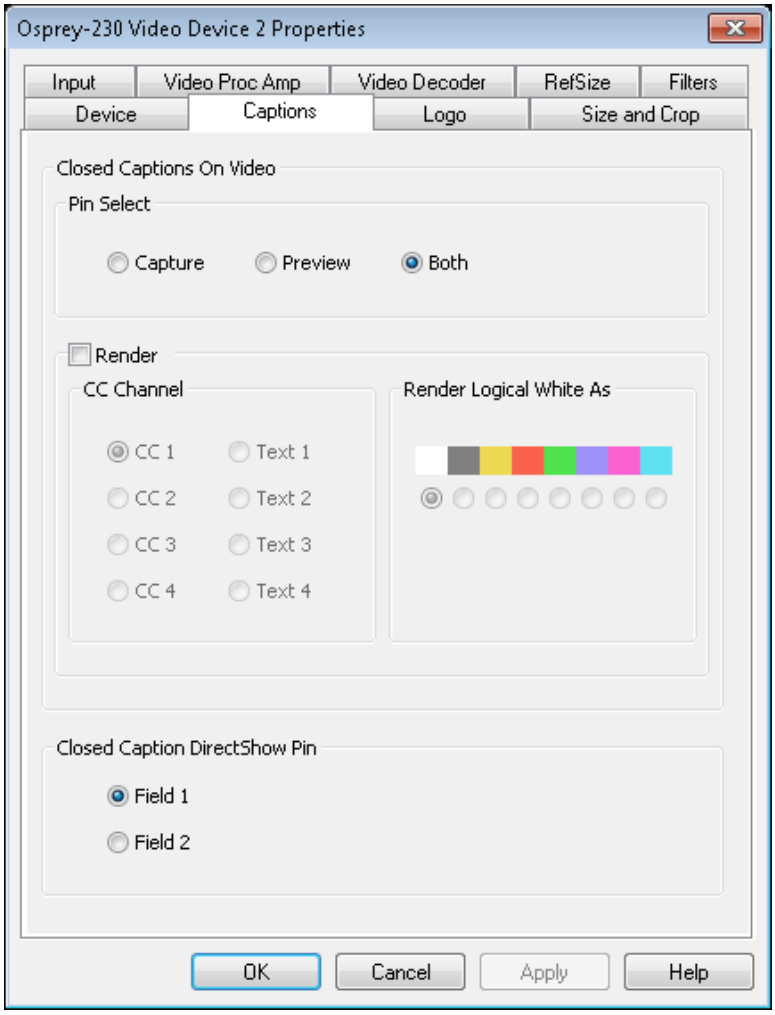
Figure 36. Device Info

This button displays useful information about the capture card and the driver, including the DirectShow name of the device (Figure 36).

Captions tab

Use the Captions tab (Figure 37) to make changes to the captioning setup. When you click **Both,** changes you make to the captioning setup apply to both the capture and preview pins. This setting is the default setting.

Figure 37. Captions tab



The Captions tab has the following controls.

Pin Select	The drop-down list has three choices: • Capture • Preview • Both
Render NTSC Closed Captions On Video	The driver can render closed captions on video when NTSC video is selected on the input.

Render Logical White as	This control group maps white captions to a color other than white.
CC Pin	This group controls whether the closed caption character pairs emitted by the DirectShow CC pin are from Field 1 or Field 2 of the video.

Osprey 5x0 Note: With these products, the driver cannot decode captions when video brightness or contrast are set at extreme values. This will be a problem when they are set to such extremes that normal video will not be viewable.

Pin Select

You can have different setups for the two pins. For example, you could enable cropping on the capture pin but not on the preview pin.

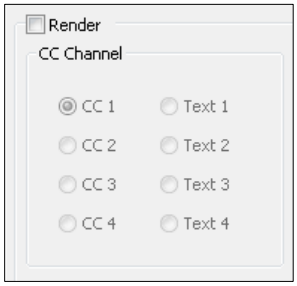
Capture	When you click **Capture**, the current captioning settings for the capture pin are loaded, and changes you make apply only to the capture pin, not to the preview pin.
Preview	The **Preview** button works analogously.
Both	When you click **Both** , changes you make to the captioning setup apply to both the capture and preview pins. This setting is the default.

Render

The driver can internally render closed captions on video when NTSC video is selected on the input (Figure 38). There is a control to select which channel to render (although CC 1 is the only channel that is commonly used).

Note: This control only affects rendering on video performed internally by the driver. The AVStream driver has two additional ways of delivering captions.

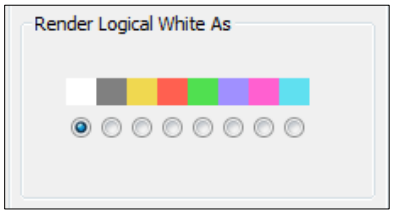
Figure 38. Render



First, it exposes a DirectShow-standard CC pin. This pin can be used directly by applications such as Windows Media Encoder's scripting facility.

Second, the driver has a proprietary Closed Caption API for use by C++ developers. It delivers raw captioning data from any CC or Text channel. It also delivers line-interpreted data from these channels, suitable for a scripting display or for capture to an ASCII file. It also delivers XDS – "Vchip" and other ancillary data – in raw form. The applet named CCChannels.exe that is included with the driver release demos these capabilities.

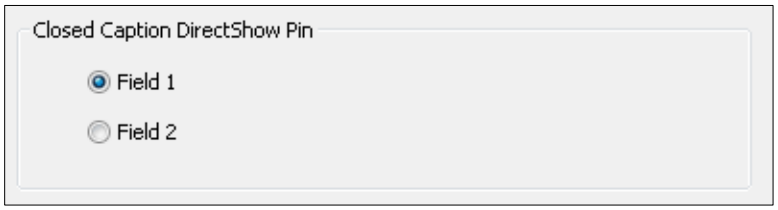
Figure 39. Render Logical White As



The control group "Render Logical White As" maps white captions to a color other than white (Figure 38 and Figure 39). This is a proprietary extension to the Closed Captioning standard. When logical white is mapped to, for example, red, the CC standard captioning red also works; however, it is not possible to distinguish "logical white" red captions from "standard colored" red captions. Since standard colored captions are so little used, this characteristic has little practical effect.

Closed Caption DirectShow Pin

Figure 40. Closed Caption DirectShow Pin

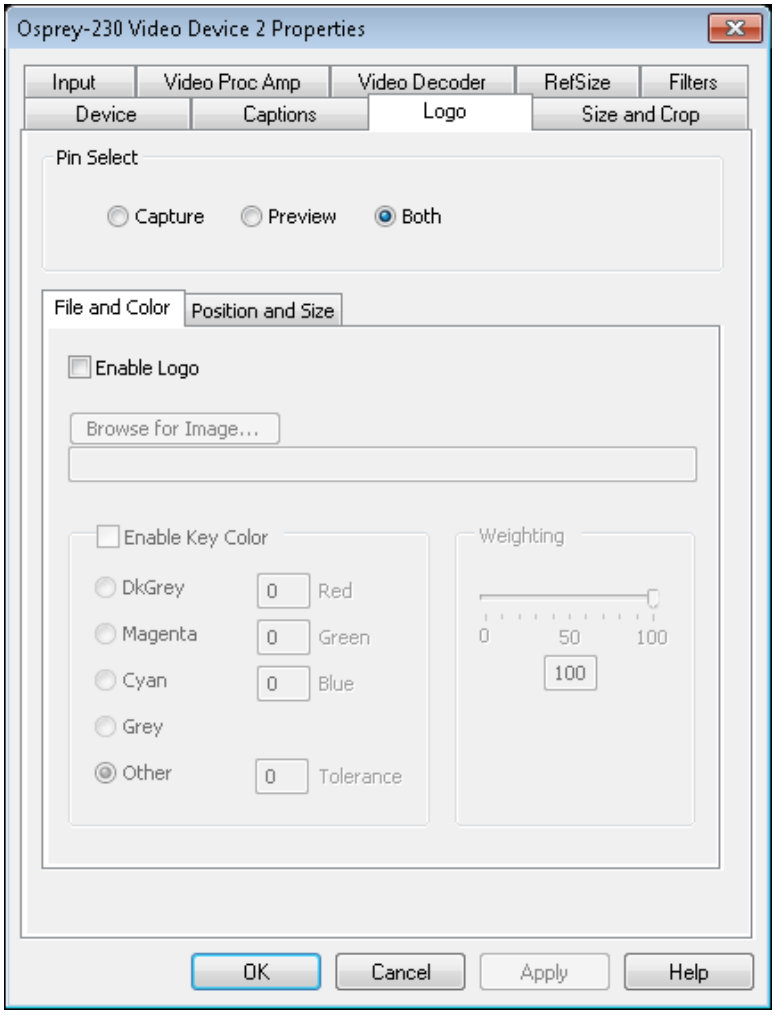


This group controls whether the closed caption (Figure 40) character pairs emitted by the DirectShow closed caption pin are from field 1 or field 2 of the video. The DirectShow specification is that closed caption on a closed caption pin is always from field 1; however, this extension allows application developers to access field 2 data such as XDS data (including Vchip) via a DirectShow standard pin.

Logo tab

Use the Logo tab (Figure 41) to superimposes a graphic over captured video using the logo property controls. By default, the Enable Logo check box is disabled.

Figure 41. Logo tab



The Logo tab has the following controls.

Pin Select	The drop-down list has three choices: • Capture • Preview • Both
Enable Logo on File and Color sub tab	From this control, enable or disable the logo.

Browse for Image…	Click this button to search for the file. You can use any RGB-24 bitmap in the log and the bmp file format.
Enable Key Color on File and Color sub tab	Control the key color and efficiency effect. Specify a selectable key color; all parts of the logo graphic with that color are not drawn on the video.
Weighting on File and Color sub tab	Set the degree of transparency of the logo to blend the logo graphic with the background video.
Position and Size sub tab	Set the position of the logo and the scale. The logo appears on both captured and previewed video. If the capture and preview video are different sizes, the logo is scaled to look the same on the preview video.

Logos have the following characteristics:

- Any RGB-24 bitmap in .bmp file format can be used.
- A selectable key color can be specified; all parts of the logo graphic with that color are not drawn on the video.
- A transparency control can be used to blend the logo graphic with the background video.
- The logo can be interactively positioned and scaled.
- The logo appears on both captured and previewed video. If they capture and preview video are different sizes, the logo is scaled to look the same on the preview video.

The logo property controls work best when you are already running preview video. With preview video running, you can view your changes interactively. (If your application displays capture video in real time, then the capture video can be used instead.)

Pin Select

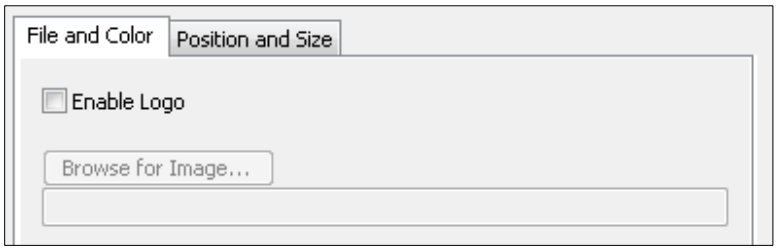
When you click **Both**, changes you make to the logo setup apply to both the capture and preview pins (Figure 41).

If you like, however, you can have different setups for the two pins. For example, you could enable the logo on the capture pin but not on the preview pin, and thereby save some CPU time. When you click **Capture**, the current logo settings for the capture pin are loaded, and changes you make apply only to the capture pin, not to the preview pin. The **Preview** button works analogously.

Figure 42. Pin Select

File and Color

Figure 43. File and Color



The **Enable Logo** check box, which is repeated on both sub-pages, enables or disables logos. If you disable logos, all your other logo settings are retained for when you re-enable logos again.

The Browse for Image… button displays a standard file select dialog. Logo files must be:

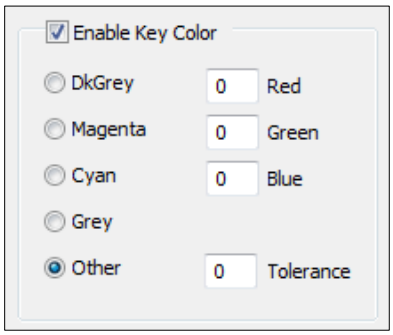
- In .bmp format with a .bmp filename extension.
- In RGB-24 format.

If you have a graphic that is in another format, edit it with a drawing or photo edit program such as Windows Paint, and save it as RGB-24.

Enable Key Color

You can control the key color and the transparency effect. If preview video is running, you will see your changes interactively (Figure 44).

Figure 44. Enable Key Color



A key color is a color that disappears from the graphic so that the underlying video shows through unchanged.

If the Enable Key Color check box is disabled, all colors are displayed.

If the check box is enabled, key coloring is activated. The five radio buttons are activated. You can select one of four standard colors – dark gray, medium gray, cyan, or magenta – or a custom color. If you click **Other** for a custom color, the three edit boxes – Red, Green, Blue – are activated, and you can enter any color value into these boxes.

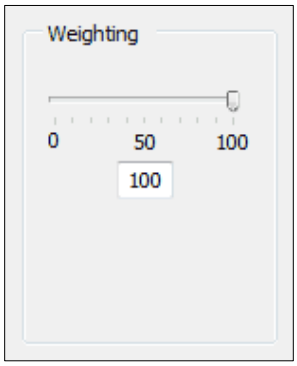
Figure 45. Tolerance

Key colors to identify transparent portions of logos can be exact or inexact and is determined by the Tolerance control (Figure 45) determines. If Tolerance is 0, then all key colors have to exactly match the Red / Green / Blue values shown in the key color control group. If Tolerance is nonzero, then the Red / Green / Blue values can deviate from the key color by the tolerance value and still be treated as being equal to the key color. For example, if Tolerance is set to 5, and the key color is set to grey (192, 192, 192), then pixels in the bitmap with value (187, 187, 187) will also be transparent.

Weighting

The degree of transparency of the logo is variable through 100 steps. If the setting is 100, the logo will be 100 % opaque. If the setting is 0, the logo will be completely transparent. If you have set a keycolor, the weighting or transparency value is applied only to pixels that do not match the keycolor and hence are always completely transparent. You can set the weighting either with the slider or by editing the number in the edit box (Figure 46).

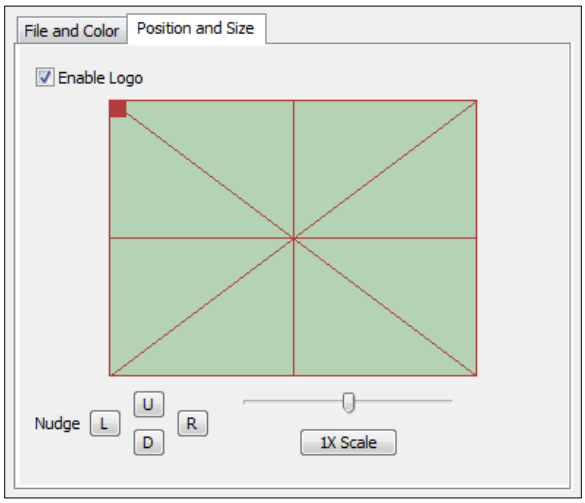
Figure 46. Weighting



Position and Size

The Position and Size sub-page lets you position and scale the logo. It is strongly recommended that you have preview video running when you use these controls (Figure 47).

Figure 47. Position and Size



The large green rectangular area at the top of this sub-page represents the video area where the logo can be positioned. The smaller rectangle represents the logo. To position the logo, click on the logo rectangle and drag it to the new position.

If logos are enabled but the red rectangle is not visible, it means that the driver could not find the logo file, or it was in a format other than 24-bit BMP.

The four Nudge buttons, L, R, U, and D, move the logo left, right, up, or down exactly one pixel at a time on the output video. Since the positioning rectangle may be scaled down from the full video size, the Nudge buttons allow more accurate positioning of the logo.

The slide control at the bottom right of this sub-page controls the scaling of the logo. The [1X Scale] button returns the size to the original size of the .bmp graphic. The quality of a scaled image will not be as good as the quality of the 1X image. We recommend that wherever possible for production work you prepare artwork of the exact size at which it will be used.

Note: Because the logo properties tab is used to set up a logo interactively on live video, its behavior is different from the behavior of the other tabs. The driver updates the controls on the logo tab immediately, without waiting for you to click ***Apply****. You will see that Apply enabled only right after you select a different pin spec. As soon as you make any change to any logo control, Apply becomes disabled and stays that way until you change to another pin spec.*

If you set up a logo with video set to one size, then resize the video, the logo is not scaled correspondingly. This may not be desirable, since you may want the logo to expand to the same scale as the video window. Click ***1X Scale*** *to restore the logo to its unscaled size or import a logo prescaled to the new desired size to ensure the best image quality.*

Size and Crop tab

The Size and Crop tab (Figure 48) has two functions:

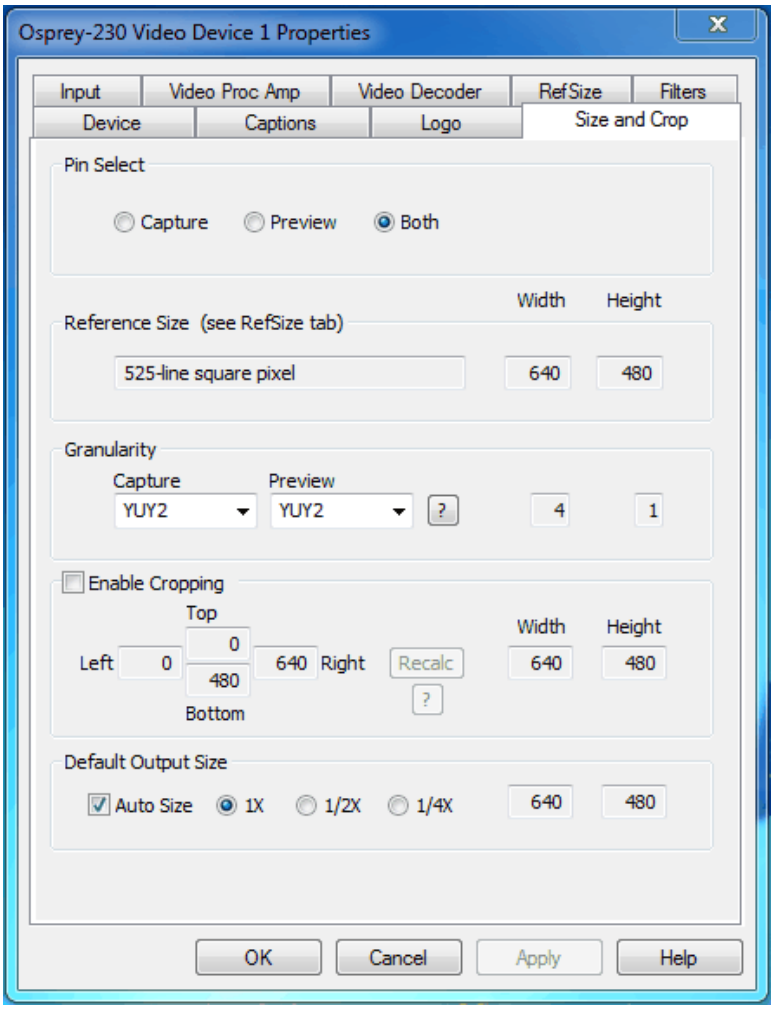
- It sets the default output size, whether or not cropping is enabled.
- It enables and disables cropping, and sets the cropping rectangle.

The default output size is the video size that appears in the DirectShow pin properties dialog as the default choice. It is a pathway for setting a custom or nonstandard video size in applications that do not have a custom video sizing controls built into them.

Cropping means removal of unwanted video around the edges of the incoming image. For example, if the incoming video is letterboxed, with an aspect ratio wider than 4:3, you can crop away the black slivers at the top and bottom of the image and capture just the active portion.

Changes made on this page apply to all video preview and capture pins on the currently selected device.

Figure 48. Size and Crop tab



The Size and Crop tab has the following controls.

Pin Select	The drop-down list has three choices: • Capture • Preview • Both
Reference Size	Displays the full uncropped size of the incoming video. This read-only information is determined by settings made on other tabs: the Input tab and the RefSize tab.
Granularity	This control helps you choose crop and output sizes that observe those restrictions
Enable Cropping	When enabled, your video is cropped to the indicated boundaries. When disabled, your video is not cropped regardless of any crop settings you may have made previously.
Default Output Size	Select the height and width of captured video from a drop-down list. The default output size is the video size that appears in the DirectShow pin properties dialog as the default choice. It is a pathway for setting a custom or nonstandard video size in applications that do not have a custom video sizing controls built into them.

Pin Select

You can have different setups for the two pins. For example, you could enable cropping on the capture pin but not on the preview pin.

Capture	When you click **Capture**, the current crop settings for the capture pin are loaded, and changes you make apply only to the capture pin, not to the preview pin.
Preview	The **Preview** button works analogously.
Both	When you click **Both** , changes you make to the crop setup apply to both the capture and preview pins. This setting is the default.

Reference Size

The reference size information is always read-only on this dialog tab. It is determined by settings made on other tabs – specifically, the Input tab, where a 525-line or 625-line standard is selected, and the RefSize tab, where Square Pixel or CCIR proportioning is selected. The read-only text box describes which of these options is currently governing the reference size.

The reference width and height represent the full uncropped size of the incoming video. Your crop settings are interpreted relative to this reference size. For example, if you are capturing 525-line video, with a reference size of 640 x 480, and your crop rectangle is (0, 0, 640, 480), then your video is effectively uncropped. But if you are capturing 625-line video, with a reference size of 768 x 576, the same (0, 0, 640, 480) crop specification will truncate the right and bottom edges of the video.

Granularity

Most video data capture formats impose restrictions on the possible width and/or height of the video, referred to as granularity restrictions. For example, the I420 capture format requires that the capture width be a multiple of 16 and the capture height be a multiple of 2.

The granularities for all products in PostProcessing Mode are as follows:

Format	Horizontal	Vertical
RGB32	4	1
RGB24	4	1
RGB555	4	1
Grayscale	4	1
YUY2	4	1
UYVY	4	1
I420	4	2
YVU9	4	4
[none]	4	1
[any]	4	4

For precuts that have Direct Mode, the granularities in Direct Mode are as follows:

Format	Horizontal	Vertical
RGB32	4	1
RGB24	4	1
RGB555	4	1
Grayscale	4	1
YUY2	4	1
UYVY	4	1
I420	16	2
YVU9	16	4
[none]	4	1
[any]	16	4

The Granularity controls show you the granularity restrictions for the selected video format, as assist you in choosing crop and output size that observe those restrictions.

Since the preview and capture pins may be set to different color formats, they may have different granularities. When the Crop tab is opened, the two drop boxes titled Capture and Preview are initialized to the current or most recently used format for the selected pin.

If the Pin Select setting is **Capture**, only the Capture granularity box will be enabled; similarly for Preview. The two small read-only edit boxes to the right of the group show the horizontal and vertical granularities for the selected color format for the selected pin type.

If the Pin Select setting is **Both**, both the Capture and Preview drop boxes are enabled, and the two boxes to the right of the group show the worst-case granularity that works for both the Capture and Preview color formats. For example, if the Capture color format is I420 and the Preview color format is YUY2, the resultant granularity is I420's more stringent 16 x 2 requirement.

The granularity and alignment settings affect values you subsequently enter for crop width, crop height, and default output width and height – they will be adjusted to these granularities. Adjustments are made when you click **Recalc**, **Apply**, or **OK**.

You can change the video format in the drop-down list, so that granularities are set for a different format.

Note: This does not automatically cause the pin to have this format – you still have to select that format using the Pin Properties dialog or via your application. It just ensures that the sizes you select will work correctly when you do select this color format in the application.

If you set up your crops with a less restrictive granularity (for example, YUY2) and then capture with a more restricted granularity (for example, I420), the driver may automatically adjust the video crop and/or output size without notifying you. Or, the capture may fail. You may also find that in the Pin Properties dialog the default size you wanted is not listed – because it is not a legal size for this format.

If you click **none** as the color format(s), the minimum granularity and alignment adjustments are applied to your crop and size data.

If you click **any** as the video format, the coarsest granularity required by any of the available formats is applied to your crop and size data. In practice, **any** is the same as YVU9, that is, 16 x 4. You are guaranteed that your crop and output sizes will never be adjusted, regardless of what video format you select now or in the future.

Enable Cropping

If you uncheck **Enable Cropping**, your video will not be cropped regardless of any crop settings you might previously have made. The edit boxes showing the edges, height, and width of your crop will be read-only and will show settings for full-frame, uncropped video.

Figure 49. Enable Cropping

If you check the Enable Cropping check box, your video will be cropped to the indicated boundaries. Previously stored crop settings will be recovered. The six edit-boxes are enabled. The Top and Left boxes set the top left corner of the cropping rectangle. The Right and Bottom boxes set the bottom right. The Width and Height boxes set the size of the rectangle.

Recalc – This button recalculates whichever of the six crop edit boxes you have not filled in. For example, if you set Top, Left, Width, and Height, **Recalc** will calculate Right and Bottom. If you set Top, Left, Right, and Bottom, **Recalc** will calculate Width and Height. Whichever of the vertical group was least recently touched, is the item that will be recalculated; similarly with the horizontal group. If you have only changed one box of the group, you can force the order of recalculation by clicking one of the other two boxes. For example, if you changed Left, and you want to preserve Width (but alter Right), then click on Width before **Recalc**. If you changed Left, and want to preserve Right (but alter Width), then click on Right before **Recalc**.

If your specification will result in a crop rectangle that is too large or too small, **Recalc** will adjust it appropriately. If it can't set up an allowed size by changing just the third most recently clicked setting, then it will try to change the second most recently clicked setting instead or as well. If it has to it will change your most recently changed setting.

Recalc will also factor in granularity and positioning requirements as required. The left edge, height, or width value of a crop rectangle may be lowered to the next smaller granularity threshold. This is the likely reason why small adjustments may not take after Recalc – they are rounded down, so nothing changes. You have to use a value that is larger than the next granularity threshold.

In the Default Output Size group, **Recalc** will change the default output size if Auto Size is checked. If Auto Size is not checked, **Recalc** will leave the output size alone.

Note: The crop width and height are subject to the granularity requirements of the selected video format, as explained in the previous section. For example, if your video format is I420 and you try to set a crop width of 360, it will get adjusted down to 352.

If you enable cropping, enter some custom settings, and then disable cropping, an uncropped specification will be displayed and your settings will disappear from view. However, the driver does remember your custom settings, and if you enable cropping again, they will reappear.

Versions 4.0.0 and later of the Osprey AVStream driver can upscale cropped video, up to the reference size.

Cropping rectangles are frame-based rather than field-based. Thus if a crop rectangle is set up defining a 320 x 240 area, then a capture of video sized at 320 x 240 will result in video being captured from two fields. You may therefore see interlacing artifacts in the captured video, unless a

deinterlacing filter is applied. This may be initially confusing since most users typically think of 320 x 240 video capture only coming from a single field and thus would not have interlaced artifacts. However, in this case, the source video is only 320 x 240 in size (i.e. the crop rectangle) and thus any captured video that is greater than the field height within the crop rectangle (equal to ½ cropped ROI height) will result in a scaled capture of multiple fields. Also, the driver will use both fields whenever they are needed to interrogatively scale the output with best possible accuracy.

Default Output Size

The standard DirectShow Properties dialog allows you to select the height and width of captured video from a drop-down list (Figure 50). The drop-down list has a particular range of choices that may or may not fit your needs. The drop-down list includes one default size that is provided by the capture driver. The Default Output Size control allows you to set up what default size will be shown.

Figure 50. Default Output Size

If you enable **Auto Size**, your default video size will be automatically sized to your crop settings. The three radio buttons, 1X, 1/2X, and 1/4X, determine whether the output size is scaled down from the crop size.

Example 1: If you are running standard 640 x 480 NTSC video, and the Enable Cropping check box is not checked, your crop size is 640 x 480. With Auto Size checked, and the 1X Crop radio button selected, your default size will be 640 x 480; with 1/2X, 320 x 240; and with 1/4X, 160 x 120.

Example 2: If you have enabled cropping with size 320 x 240 (one quarter of the full video area), the default Auto Sizes are as follows: 1X, 320 x 240; 1/2X, 160 x 120; 1/4X, 80 x 60.

If you leave Auto Size unchecked the default size radio buttons are disabled and the height and width edit boxes are enabled. You can set any default size with the following two restrictions:

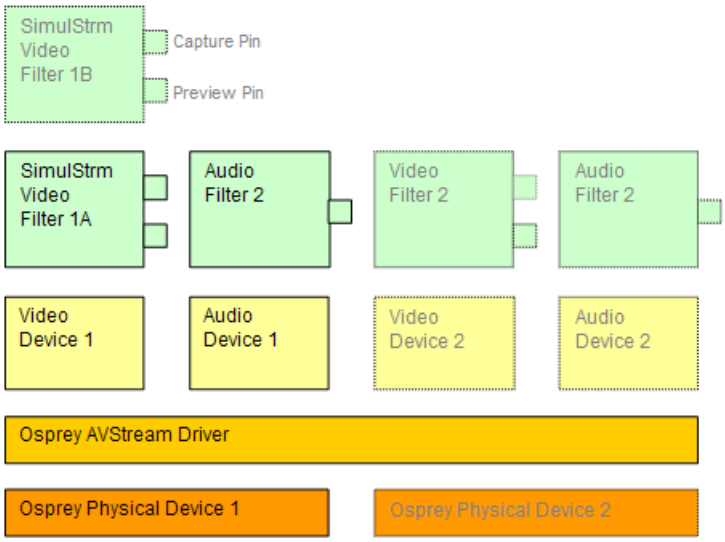
- Since the driver does not upscale video, the default size must be smaller than the crop size. For example, if the crop size is 320 x 240, you cannot set default output size 400x300.
- Sizes are subject to the granularity requirements of the selected video format, as explained in the Granularity section above. For example, if your video format is I420 and you try to set a default width of 360, it will get adjusted down to 352 as soon as you click on another control.

Note: Pin Properties dialog default entry does not appear in the default VFW/DirectShow mapper dialog. Thus, unless a VFW application, like Virtual Dub, specifically allows for custom resolutions, the VFW app will only be able to select from the options the VFW/DirectShow mapper lists.

AVStream driver reference information

In DirectShow, the words “filter” and “pin,” as well as “driver” and “device,” are frequently used. Figure 51 illustrates their relationship as they apply to Osprey hardware and drivers.

Figure 51. Filters, pins, and properties



At the bottom of this diagram are one or more physical Osprey hardware devices. All Osprey devices of a given type (such as Osprey 230 or Osprey 560) are controlled by a single Osprey binary, the Osprey AVStream Driver. For each physical device the AVStream Driver creates one logical Video Device and one logical Audio Device.

On top of each Osprey logical Video Device, one or more Video Filters is created. If the SimulStream option is not installed, there is a single Video Filter for each Video Device. If SimulStream is installed, there can be multiple Video Filters for each Video Device

The distinction between Device and Filter is important mainly to SimulStream users. For non-SimulStream users, Device and Filter effectively mean about the same thing. For SimulStream users, each SimulStream Filter acts as a virtual device that can be accessed by name and can deliver a separate video stream with its own independent control settings.

When SimulStream is enabled, some functions and capabilities are device-level, and others are filter-level. Examples of device-level functions are input select, and the controls for brightness, contrast, hue, saturation, and sharpness. These are closely tied to the underlying hardware of the device, which inherently allows only one input to be selected at a time, and one set of hardware control settings to be applied. Examples of filter-level functions are crop, logo, and caption settings, which can be different for each video filter, and in fact for each pin of each filter. Some other

capabilities such as deinterlace and software gamma correction could logically be either device-level or filter-level, but are treated as device-level for practical reasons.

Each Video Filter has one Capture Pin and one Preview Pin. A pin is the source or destination of a video or audio stream. A video capture pin is a general purpose pin used for capture to a file, an encoder, an on-screen renderer, or any other destination. A video preview pin is mainly intended for on-screen rendering. Each Osprey Video Filter also has a Closed Caption pin and a Vertical Blanking Interval (VBI) pin for capture of specialized ancillary data.

On top of each Osprey logical Audio Device, one Audio Filter is created, with one or more pins capable of sourcing one or more audio streams. There is not much practical distinction between an Audio Device and an Audio Filter in either the SimulStream or non-SimulStream cases.

Both devices, filters, and pins may have associated Properties. Properties are control parameters that can be read from or written to the component. Some Property Pages are standard Windows DirectShow pages. For example, the Property Page for an individual pin is a standard DirectShow page. The Video Proc Amp and Video Decoder pages are also DirectShow-standard. The rest are proprietary to the Osprey driver.

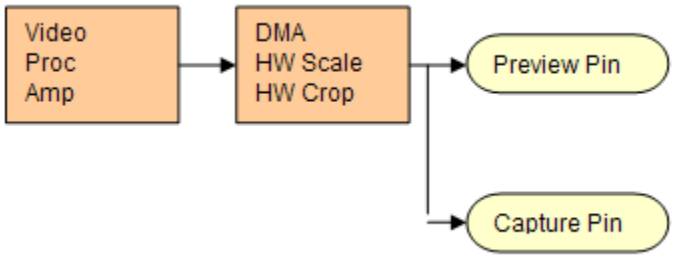
As a user, you interact with Property though visual Property Sheets, Property Pages, or Property tabs that are part of a tabbed dialog. As a programmer, you can set properties directly from within the code of your application, using either the standard DirectShow API or the custom Osprey extension API that is available from Osprey by Variosystems in an SDK.

Overview of Direct Mode and PostProcessing Mode

The 4.0.0 driver has two distinct operating modes. Direct Mode is a simple, low overhead mode for basic capture. PostProcessing Mode enables a number of filters, transforms, and renderers within the driver, and supports the SimulStream option.

Direct Mode

Figure 52. Direct Mode



The purpose of Direct Mode is to capture and/or preview video with very low CPU overhead. It is meant for low capability machines and for other cases where it is imperative for the driver to use as little CPU as possible. Scaling, cropping, and color conversion are done in hardware, incurring no processing overhead – but at the cost of reduced flexibility.

Figure 52 depicts a graph of Direct Mode processing; the drawing is mainly interesting as a comparison point for the PostProcessing Mode drawing in the next section.

In Direct Mode, each device has one video capture pin, and one video preview pin. Video can be cropped and scaled, and the crop and scale specifications can be different for two pins.

In Direct Mode, the driver does not apply deinterlacing, gamma correction, logos, or on-video captioning.

There is no SimulStream in Direct Mode; if SimulStream is turned on, the Direct Mode control is deselected and disabled.

In Direct Mode, the driver is somewhat restricted in the combinations of capture and preview video that it can produce at the same time. If the capture pin alone is used or the preview pin alone is used, the driver can produce video in any size and rate.

If both the capture and preview pins are used, the limitations to video size and rate are as follows:

- The capture stream is pre-emptive over the preview stream, in accordance with Microsoft recommendations for video capture drivers. That is, if (1) there are both a preview and a capture pin; (2) the capture pin frame rate is 29.97 frames per second (25.0 PAL/SECAM); and (3) the source video of either or both pins is interlaced, using both video fields, then there will be *no* preview video – the preview window will be blank. If the above conditions hold except that if the

capture pin frame rate is less than 29.97, then the preview rate will be 29.97 minus the capture rate. In other words, the preview pin will obtain a video frame only in time slots when the capture pin does not require one. The driver never copies video from one pin to another in Direct Mode.

- On the Osprey 2X0 and 440, Direct Mode supports Closed Captioning delivered to the DirectShow CC pin, as well as to the new Osprey proprietary CC streaming interface demoed by the CCChannels applet supplied with the driver. The Osprey 530 implements Closed Captioning differently, and captioning of all types requires Post Processing Mode. Direct rendering of captions on video within the driver requires Post Processing Mode for all Osprey boards.

PostProcessing Mode

Figure 53. PostProcessing Mode

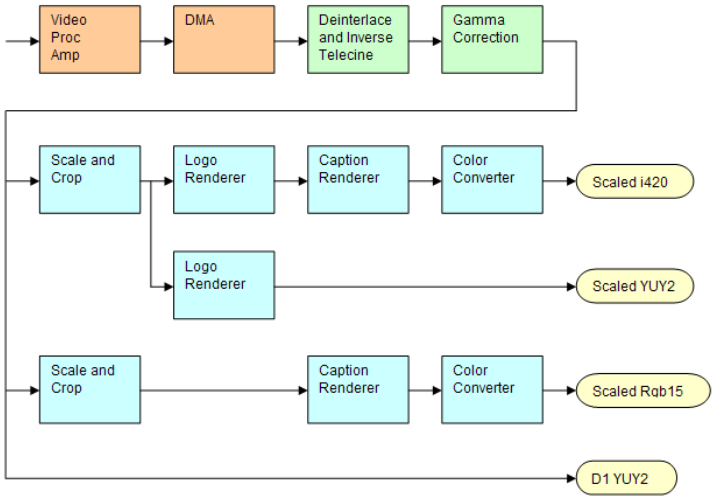


Figure 53 shows a possible graph of video data flow within the driver in PostProcessing Mode. This particular graph assumes that SimulStream is activated so that more than two video pins are possible. There are four video output pins, represented by the pale yellow round rectangles:

- The upper pin produces scaled and/or cropped I420 video, with a logo (bug) and Closed Captions rendered on the video.
- The second pin produces scaled and/or cropped YUY2 video with a logo but no captioning. In this particular graph, the upper two pins are scaled and cropping identically, so a single scaling operation can service both pins.
- The third pin has a different scale/crop specification, so its video runs through a separate scaler/cropper. The video is captioned and converted to RGB15.
- The lower pin produces unscaled, uncropped D1 YUY2 video with no logo or captioning.

The video routed to all pins in this example is deinterlaced and gamma-corrected. Deinterlace or inverse telecine, if used, are always applied globally to all pins, as is gamma correction. Scaling, cropping, logoing, captioning, and color format conversion are performed separately for each pin.

Compared to Direct Mode, PostProcessing Mode adds the following capabilities:

- With SimulStream disabled, there is still a maximum of one capture pin and one preview pin on the device at a time. However, there are no restrictions on combinations of video size and rate, color formats, or crop settings. The driver will color convert and copy video as required to deliver up to 25 or 29.97 frames per second in any format to the two pins.

- With SimulStream enabled, there can be multiple capture pins and multiple preview pins. Each capture and preview pin pair is placed on a separate filter. The maximum number of each type of pin is the same as the maximum number of filters you have elected to expose in the SimulStream control group. Any pin can produce video at any size, rate, color format, and crop setting. Of course, there will be practical limits imposed by the bandwidth of the machine.

The following post processing filters can be applied, with or without SimulStream enabled:

- Motion adaptive deinterlacing and inverse telecine
- Gamma correction
- Logos
- On-video caption rendering

Some of these filters operate globally on all filters and pins of a device, and some operate on a per-filter or per-pin basis:

The Video Proc Amp controls – Brightness, contrast, hue, saturation, and sharpness – are applied globally in hardware to the incoming video.

The basic reference size – CCIR-601 or square pixel – is established in hardware. Horizontal delay and Osprey 530 width select are also performed in hardware.

Deinterlace / inverse telecine and gamma correction are applied to all filters and pins on the device and have the same settings for all filters and pins. (Adaptive deinterlacing does not affect quality of single field 2:1 or 4:1 exact-scaled video, so long as the sharp algorithm is used. Inverse telecine does not affect single field exact-scaled video.)

Crop, logo, and caption settings can be different for each pin of each filter, and the driver maintains separate settings for each filter and pin.

Video size, color format, and frame rate can also be different for each pin. It is the responsibility of the application to maintain these settings.

Efficient Video Rendering

The following information is primarily useful to developers, but may also be helpful for those who want to fine-tune existing applications. If you are seeing poor rendering performance, in terms of either excessive CPU utilization or jerky, stuttering video, read this section.

There are at least four basic ways to render video from the capture driver onto the screen. They vary greatly in their efficiency, and applications do not always make the best choice of renderer.

In these descriptions, it is assumed that the AVStream driver's Preview Pin is being used. The results would be the same if the Capture Pin were used instead.

Preview Pin to Video Renderer

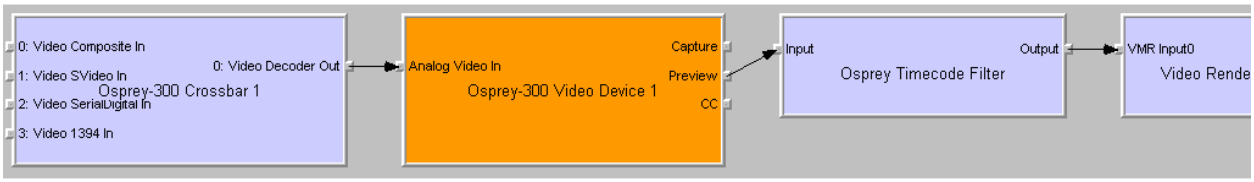
Figure 54. Preview pin to video renderer

Video renderer is the oldest and simplest DirectShow renderer. It does not use DirectDraw in the rendering process, which makes it substantially slower than VMR7 described below. It is the default rendering pathway that will be chosen when an application says “Render” without specifying a preferred pathway. For this reason, many applications deliver unnecessarily slow rendering performance.

Video renderer works best when your output format is RGB rather than YUV, with the RGB format matched to your screen depth. On most modern systems, that means RGB32 is the preferred format. If a YUV format is used, an extra filter, AVI Decompressor will be inserted into the graph to convert the YUV to RGB. The driver can do this conversion faster internally.

Preview Pin to Overlay Mixer to Video Renderer

Figure 55. Preview pin to overlay mixer to video renderer



Compared to a direct connection of Preview Pin to Video Renderer, the combination of Overlay Mixer plus Video Renderer provides performance that is …different. It is hard to be more specific than that without reference to specific machines; refer to the data tables below.

This pathway is the only one that renders closed captioning correctly when a DShow CC or VBI pin is used rather than the driver’s internal rendering. For CC rendering, the output of the Line 21 filter connects to an input of the Overlay Mixer.

The best video format to use with Overlay Mixer is YUY2.

Preview Pin to VMR7

Figure 56. Preview pin to VMR7

VMR7 is short for Video Mixing Renderer 7. VMR7 is a newer renderer that is generally much faster than the old Video Renderer. When the driver is running in Direct Mode, VMR7 uses an efficient DirectDraw configuration to render with almost no CPU overhead, especially when YUY2 video is used. When the driver is running in PostProcessing Mode, DirectDraw is not used but it is still the fastest renderer.

Unfortunately, VMR7 is not the default video renderer in building a filtergraph – an application must explicitly ask for VMR7 in its graph in order for it to be used. This causes many simpler applications to render video much less efficiently than they might.

VMR7 works best with YUY2 video and there is usually little reason to use any other format. It will, however, work fairly well with the RGB format – usually RGB32 – that matches the current screen depth. We recommend letting DirectShow choose the video format. It will generally make the correct choice. In particular, on some (usually older) systems, if two video frames are to be rendered with VMR7 at the same time, only one can be YUY2; other(s) will be RGB, with a conversion filter inserted into the graph if necessary.

We do not provide an RGB24 option on the preview pin for use with 24-bit screens because on at least some display adapters the rendering of RGB24 to VMR7 is incorrect.

Note: VMR7 cannot be used when closed captions are to be rendered from the driver's DShow-standard CC or VBI pin – use the Overlay Mixer to Video Renderer pathway instead. If the driver's internal rendering is used, the VMR7 will work and is recommended.

Preview Pin to VMR9

Figure 57. Preview pin to VMR9

Video Mixing Renderer 9 is the newest video rendering method and the one on which Microsoft supposedly will base its future development. The intent is to combine the functionality of the Overlay Mixer plus Video Renderer in one module that takes advantage of the latest developments in DirectShow. We are finding that at its present stage of development, with our hardware, VMR9 does not achieve the very high efficiency of YUY2-to-VMR7. Also, although VMR9 is supposed to function as an overlay mixer for rendering captioning from the driver's DShow CC or VBI pin, we have never seen it function correctly.

Some Data Points

The following measurements are CPU percent on two machines – a fairly old P4, and a newer dual Opteron 244. The video size is 640 x 480. The screen depth is 32 bits. The following abbreviations are used:

YUY2 = the Osprey driver's preview pin in YUY2 format
RGB15 = the Osprey driver's preview pin in RGB15 format
RGB32 = the Osprey driver's preview pin in RGB32 format
VR = old Video Renderer
VMR7 = Video Mixing Renderer 7
VMR9 = Video Mixing Renderer 9
AVI = AVI Decompressor
OVL = Overlay Mixer

The PostProc results are shown in two modes: with all post processing filters turned off, and with the adaptive deinterlace filter turned on.

Generally these results show the following:

- The great desirability of newer machines for video processing. This has to do with system architecture more than raw CPU speed.
- VMR7 is generally fastest. If you don't need the driver's PostProcessing, then Direct Mode with VMR7 is especially fast.
- Results for specific pathways can be inconsistent across different machines. For example, on the P4, YUV to VR is faster than RGB to VR; on the Opteron, RGB is faster.

In evaluating these benchmarks, bear in mind that all of them involve video rendering to the screen. Depending on the exact pathway, video rendering can result in CPU utilization that is a lot higher than for other capture scenarios. Specifically, writes to display adapter memory that are performed by the CPU rather than with direct memory access (DMA) operations may be inordinately slow. If

you are streaming video or capturing to file you will not see numbers this high. If you are encoding video, you may see high CPU utilization, but much or most of it will be from the encoder rather than the driver.

Video standards and sizes

Video standard refers to whether the video signal format is NTSC, PAL, or SECAM. Depending on the exact product version you have, some or all of the following standards will be available:

525-line formats:

- NTSC-M – North America
- NTSC-J – Japan

625-line formats:

- PAL-B, D, G, H, I, M, N – many countries in Europe and elsewhere. B, D, G, H, and I refer to five nearly identical subformats.

Full-sized NTSC-M and NTSC-J have 525 lines total, 480 lines visible, per frame and a display rate of 59.94 fields per second, or 29.97 interlaced frames per second. Although capture-to-PC applications normally use only 480 video lines, the full NTSC frame actually contains 485 video lines, and the AVStream driver provides a control to capture all 485 lines. The control is located on the RefSize property tab.

Full-sized PAL and SECAM have 625 lines total, 576 lines visible, per frame and a display rate of 50 fields per second, or 25 interlaced frames per second.

The standard frame sizes are different for NTSC and PAL. For example, the half-frame size in pixels is 360 x 240 for NTSC, and 360 x 288 for PAL. The driver automatically adjusts the reference size and default size for the video standard you are using.

Color Formats

The Color Format is the arrangement of data bits representing the colors of each pixel. For example, in the RGB555 format, each pixel of data is stored as 5 bits of red, 5 bits of green, and 5 bits of blue color information.

Video delivered by the Osprey board to the system is in uncompressed format. It is possible to compress the video at a subsequent stage of processing. However, this dialog field refers specifically to the uncompressed raw video that the board delivers to the system.

The Osprey AVStream driver supports the following capture pin formats.

- YUY2 and UYVY - Each pixel is represented with a total of 2 bytes (16 bits) of data. The data is encoded as separate data for luminance (intensity) and chrominance (color). This mode is mainly used as an input to software compressors. See YUV Format Details below.
- YUV12 planar - Also known as I420. This is a complex format in which there are in the aggregate 12 bits of data per pixel. Each pixel has 8 bits of luminance data. Each group of 4 adjacent pixels arranged in a 2 x 2 square shares two bytes of chrominance data. See YUV Format Details.

- YVU9 planar - Similar to YUV12 planar, except that there are in the aggregate 9 bits of data per pixel, and each byte pair of chrominance data is shared by 16 adjacent pixels arranged in a 4 x 4 square. See YUV Format Details.
- RGB32 - Each pixel has four bytes (32 bits) of data - one each for red, green, and blue, plus one byte that is unused. The pixel has 256 shades of each of the three colors, for a total of 16.7 million colors.
- RGB24 - Each pixel has three bytes (24 bits) of data - one each for red, green, and blue. This is another "true color" mode with 16.7 million colors.
- RGB555 - Each pixel has two bytes (16 bits) of data. There are 5 bits each of red, green, and blue data; the sixteenth bit is unused. This is a "high color" mode, also known as "5:5:5."
- RGB8 (Greyscale) – The Osprey AVStream driver uses the RGB8 format for greyscale video. RGB8 is a palletized format. Each pixel is represented by one byte, which indexes one of 256 colors in a color palette specified by the driver. The Osprey driver sets the color palette to greyscale entries, and captures "Y8" luminance-only data.

YUV Format Details

YUY2, UYVY, YVU9, and YUV12 are YUV formats. In these formats, each pixel is defined by an intensity or luminance component, Y, and two color or chrominance components, U and V. Since the human eye is less sensitive to color information than to intensity information, many video formats save storage space by having one luminance byte per pixel while sharing the chrominance byte among two or more pixels. YUV is also similar to the color encoding used for analog color television broadcast signals.

YUY2 mode, sometimes referred to as 4:2:2 packed mode, consists of a single array of mixed Y, U, and V data. Each pixel has one Y (intensity) byte. Each pixel shares its U and V bytes with one of the pixels horizontally next to it.

YUY2 uses the same number of aggregate bytes per pixel as RGB15, which is two. However, YUY2 is more efficient than RGB15 because it stores relatively more of the intensity information to which that the human eye is most sensitive.

UYVY mode is similar to YUY2 except that the bytes are swapped as follows:

- YVU9 and YVU12 are "planar" modes - the Y, U, and V components are in three separate arrays. It is easiest to explain the format with an example: Let's say you have a 320x240 YVU9 format. The buffer has 320x240 bytes of Y data, followed by 80x60 bytes of V data, followed by 80x60 bytes of U data. So each U and each V byte together contain the color information for a 4x4 block of pixels.

Similarly, a 320 x 240 YUV12 format has a 320 x 240 Y array, followed by a 160 x 120 U array, and then a 160 x 120 V array.

Note: In the I420 format used by Osprey, the order of the U and V arrays is reversed from the order in the YVU9 format.

Closed Captioning (CC)

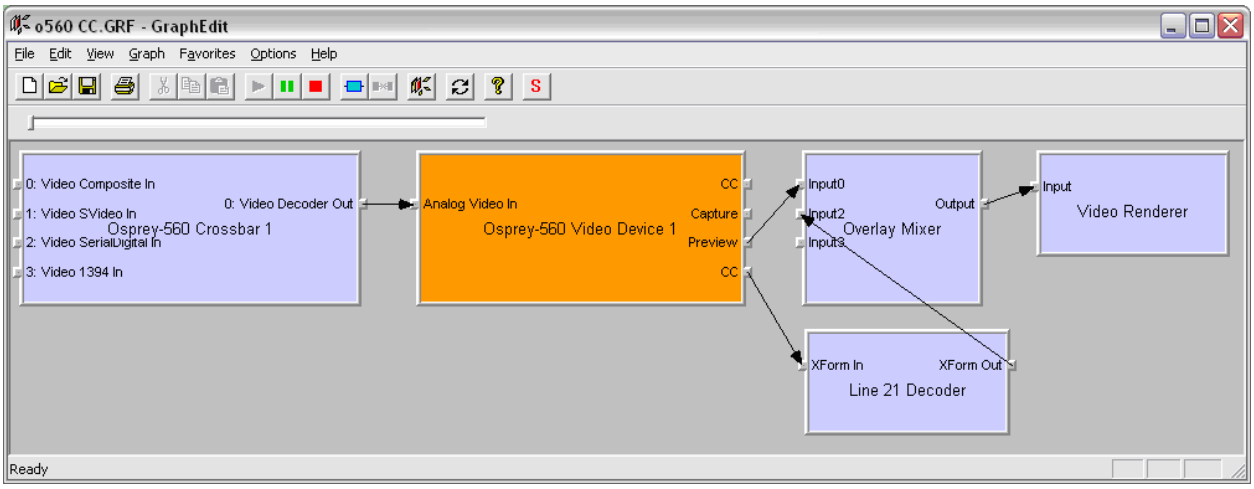
The Osprey AVStream driver supports NTSC closed captions in three separate ways.

- Through standard DirectShow CC and VBI pin.
- By rendering captions directly onto video on the capture or preview pin. The captioned video can be streamed, written to file, or rendered directly.
- Through an Osprey custom property.

On products other than the Osprey 530/540/560, the driver also provides PAL/SECAM captions as well as teletext data in raw form via the VBI pin (not through the CC pin). Refer to the next section on Vertical Blanking Interval (VBI) Capture for more information. The rest of this section is specific for NTSC captioning only.

Captioning via CC or VBI Pins

Figure 58. Captioning via CC or VBI pins



The driver supports the standard DirectShow CC and VBI pins (on the Osprey 530/540/560, the CC pin only; on the other products, both pin types). The CC character pair data can be streamed to applications such as Windows Media Encoder 9, or rendered directly to the screen using the DShow Overlay Mixer filter. The 4.0.0 driver can be set to output CC field 2 character pairs on the CC pin, instead of the standard CC field 1 data. XDS (Vchip) data is embedded in the field 2 stream.

The GraphEdit filtergraph shown here displays CC on rendered onto preview video. The Line 21 Decoder downstream of the Osprey 530 capture filter interprets the CC pairs and renders an overlay of the characters. The Overlay Mixer combines the CC overlay with the preview video, which is then rendered onscreen. It is also possible to capture the character pair stream as a standard stream of an AVI file, (although there will be problems with timestamping and synchronization); or, to directly manipulate the CC stream in a standard way with a custom application.

Our testing with the current version of DirectX 9 indicates that closed captions do not render properly with the VMR9 renderer in place of the Overlay Mixer / Video Renderer combination. Therefore, the default Video Renderer in combination with Overlay Mixer should be used.

When SimulStream is not installed, the driver supports two CC pin instances. One could be associated with the video capture stream, the other with the preview stream. In practice, a DirectShow Smart Tee Filter can be inserted into the graph to make any number of VBI pins. When SimulStream is installed, you can have two CC pin instances per SimulStream filter.

Three user-accessible controls are built into the driver that affects Closed Captioning.

- On the RefSize property page, in the control group shown below, 480-line video must be selected and the radio button to start video at either "Lines 23/286" or "Lines 22/285" must be selected.
- On the Captions property page, most of the controls relate to the driver's internal direct rendering on video. The following control selects field 1 or field 2 as the field to be streamed through the CC pin. This control is per-filter; both available pins on the filter are set the same way. For SimulStream users, the pins on different filters can have different settings.
- On the Device ➢ Extras… property page, you have the choice to set with "Normal" or "AVI-Compatible" timestamping of Closed Caption samples.

This control is a workaround to what an apparent problem in DirectShow – if you attempt to capture a CC character pair stream to an AVI file with Normal timestamping, the file will become extremely large and the capture will fail within a few seconds. The AVI-Compatible mode allows capture of CC to AVI. Unfortunately, the problems with timestamping mean that time synchronization between the video and CC streams depend on their physical interleaving in the file, so that time synchronization will be poor. If the AVI file is set up to be non-interleaved, synchronization is not very good. If the AVI file is set up to be interleaved, synchronization is poor.

For all applications other than capture to AVI, this control should be set to Normal. WME9 among others requires the Normal setting if CC is used.

Windows Media Player will not play back an AVI file with an embedded CC stream. The following GraphEdit filtergraph will play back an AVI file containing a video stream plus a CC stream, with the CC rendered on the video:

Direct CC Rendering on Video

The driver can render closed captions directly onto capture or preview video. The captioned video can be encoded, written to file, or rendered directly to the screen. The driver has to be in PostProcessing Mode.

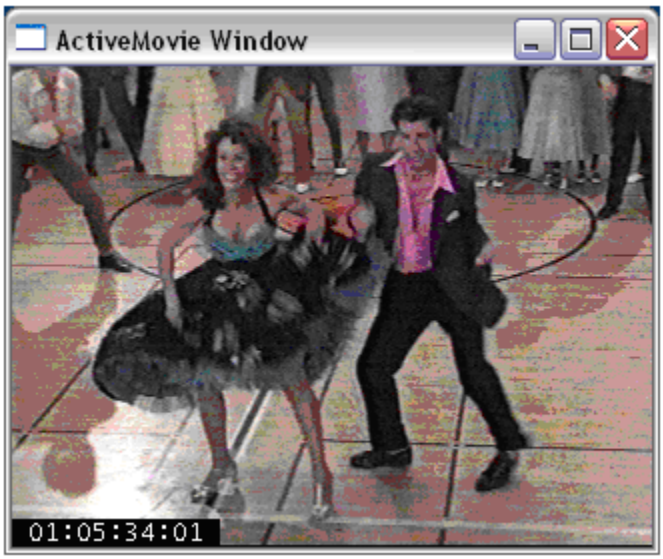
CC Streaming Interface

The driver supports an Osprey custom property which provides the closed caption character stream for use by custom applications. The Osprey filter named CCLineInterp.ax, supplied with the driver package, provides user-mode support for this captioning mode. The Osprey sample applet named CCChannels.exe, also supplied with the driver package, demos a CC line interpreter and XDS (Vchip) extraction and display. Refer to the documentation for the Osprey AVStream SDK, version 4.0.0, for a description of this interface for developers. Both the filter and the applet are provided in source code form in the SDK.

Vertical Interval Timecode (VITC)

Vertical Interval Timecode (VITC) data is embedded in the Vertical Blanking Intervals (VBIs) of some video content. Timecodes mark each frame with an hour / minute / second / framenumber marking that can be use for frame-precise editing.

Figure 59. ActiveMovie Window



The current Osprey VITC implementation is preliminary in nature. The features and method of implementation are subject to change. We invite comments on the timecode-related capabilities that you need for your application.

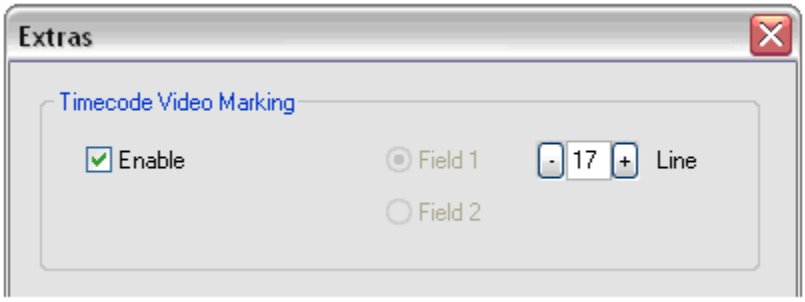
Osprey's approach to VITC is to invisibly watermark the video bits of each outgoing video frame with its timestamp data. The illustration shows a timecode extracted from a watermarked frame and rendered as text on the video. Four elements are used to produce it:

- The device extracts timecode data from the vertical blanking interval (VBI) waveform.
- The driver watermarks timecode into the video preview or capture pin's output data.
- A custom filter decodes the watermark from the video and renders it.
- A GraphEdit graph combines the required filters.

The filtergraph is as follows:

- The Osprey Timecode Filter resides in the module TCOverlay.ax and is installed and registered as part of the standard driver installation. The source code for this filter is included in the Osprey AVStream SDK.
- The Osprey Timecode Filter also exposes to applications a custom property and callback function that allows it to return the VITC data for each frame along with the frame's timestamp to the application. Since use of this capability requires custom programming it will not be further discussed here. Refer instead to the *Osprey AVStream SDK Users' Guide*. A sample SDK applet named TCApp illustrates the interface.

Figure 60. Timecode Video Making



Timecode stamping must be enabled in the driver before it can be used, and the field and line number correctly set. The Osprey 530/540/560, unlike the Osprey 100 and 200 series devices, does not implement an autosearch function to find the VITC line. To access the controls, go to the Device property tab and click **Extras…**

It is recommended that timecode marking be disabled when not in use, especially the auto search feature – on a slow machine it uses several percent of CPU bandwidth - especially if timecodes are not present.

Note: VITC and LTC – Longitudinal Timecode – are two distinct encoding systems, and this driver supports only VITC.

A suggested reference on timecode is *Timecode*: a user's guide – 3rd ed., John Ratcliff, Focal Press, 1999.

Vertical Blanking Interval (VBI) Capture

The Osprey 530 does not support VBI raw capture. It only supports decoded capture of the two special streams, Closed Caption (CC) and vertical interval timecode (VITC). If your application requires VBI capture for WST teletext decoding or other purposes, and you are using analog inputs, you can use an Osprey 100 or 200 series device instead.

The Osprey AVStream driver provides DirectShow-compatible VBI pins. VBI data includes Vertical Interval Timecode (VITC) in both the NTSC and PAL worlds. In NTSC, line 21 Closed Captioning, (although it is part of the video interval rather than true VBI data) is commonly treated as VBI data. In PAL, World Standard Teletext (WST) is encoded in the VBI data region.

The driver delivers VBI data as raw waveforms, which are then decoded by external DirectShow filters. DirectShow provides three filters under the classification “WDM Streaming VBI Codecs” that will decode data from VBI pins:

- CC Decoder
- NABTS/FEC VBI Codec
- WST Codec

With the Osprey AVStream driver, either the CC pin or the VBI pin can be used to obtain closed caption data. If the VBI pin is used, an extra filter is required to turn the raw waveform into CC character pairs. The filtergraph below shows NTSC CC using the VBI pin; the graph in the CC section above shows CC from the CC pin; in the graph below, a CC Decoder filter must be inserted into the graph.

For PAL/SECAM, the following graph will display teletext and CC. (In this graph, to view CCs you have to select the CC page – probably page 801 - in the WST Decoder properties.)

When SimulStream is not installed, the driver supports two VBI pin instances. In practice, a DirectShow Smart Tee Filter can be inserted into the graph to make any number of VBI pins. When SimulStream is installed, any number of VBI pins is allowed.

Audio driver

Setup and control for audio are much simpler than for video.

Note: The following directions are for Windows XP. Access directions and screens may appear different for other operating systems.

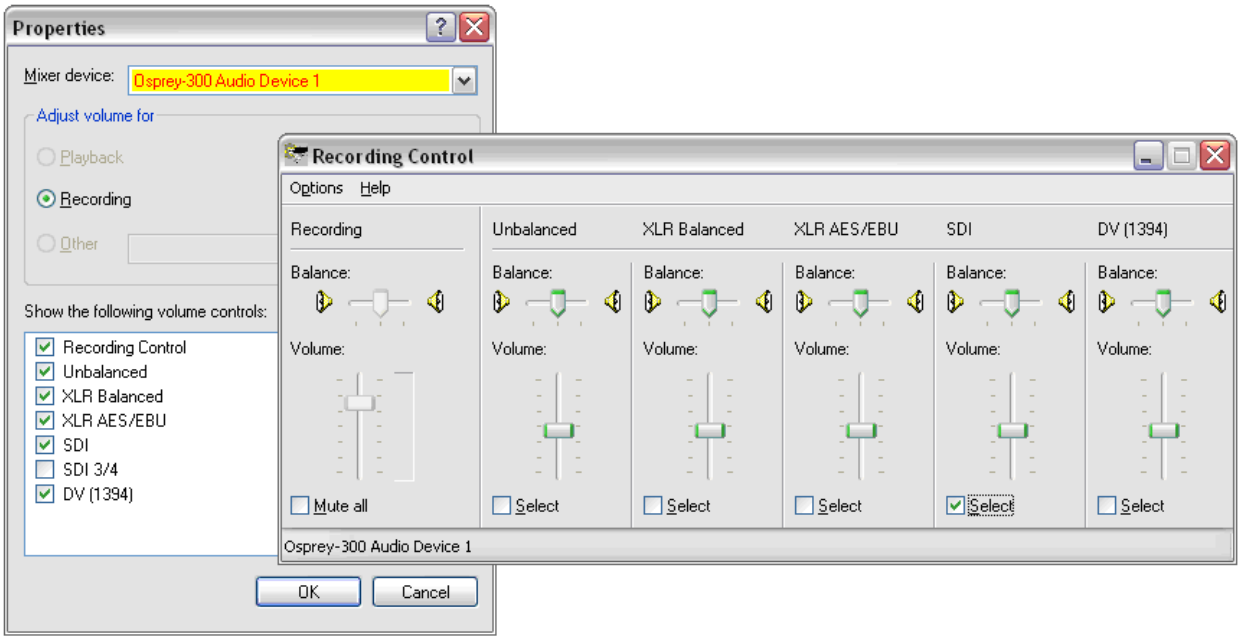
Selecting the audio source and input volume

The audio source is set using the Osprey mixer driver interface. Most applications, including the Windows Media Encoder applications, interface to the mixer driver directly and expose the look and feel specific to that application. However, the default Windows interface to the mixer driver can also be used. There are two simple methods for getting to the mixer source and volume control dialog box.

The easiest method for accessing this interface is to right click the speaker symbol on your taskbar (typically on the bottom right-hand side of your screen). Then select the Open Volume Mixer option.

Figure 61. Volume control

Figure 62. Recording Control



To get to the Osprey audio capture (recording) device, select Properties under Recording Control's Options menu. This pops up the Properties dialog. Click on the Mixer device list at the top to see the list of audio input and output devices, including one or more Osprey cards. When you have chosen the device, click **OK**, and you will be returned to the Recording Control display.

The Osprey device is not a mixer in that it does not allow for mixing the various audio sources. Therefore, when one audio input is selected, any other input previously selected becomes unselected. The Select check box at the bottom of each source sets which source is actually being used.

Osprey cards have hardware gain control. To control hardware gain, use the volume slider in the mixer applet. The unity gain setting is when the volume slider is all the way up (in default driver settings).

The quick-access volume control (left click on the speaker symbol) on the task bar controls recording volume and playback volume. To change record levels, go to **Options ➢ Properties ➢ Recording**.

Audio properties

Many applications, including Windows Media Encoder, display a property dialog for setting audio source and volume level. This page is a general-purpose DirectShow property page that our driver has to support, but which is not quite intuitive in its operation.

To select the audio source:

1. Select the desired input in the Pin Line: selection box.
2. Click **Enable**.

Note: This action will deselect whichever input had been previously selected.

The confusing part comes up when you select any input other than the first on the list, which happens to be Unbalanced. Let's say you click **Master Volume**. When you close and reopen the dialog it displays Unbalanced in the selection box. It will look like the selection has been lost, but then you will notice that **Enable** is not checked. If you again click **Master Volume**, the Enable box will automatically show up as checked.

With the Osprey 530/540/560, which has multiple audio inputs, further confusion arises if you forget which input you had selected in the previous session and for some reason you want to discover this rather than just select an input for the new session. The only way to do that is to try all the inputs listed in the select box until you find the one for which Enable is checked.

This property page makes more sense if you understand that it is designed to allow mixing of audio inputs for devices that support that. Osprey audio capture filters do not support mixing of inputs - you have to select one stereo input at time - so the DirectShow design is not very convenient in our case.

Audio Formats

The Osprey hardware supports sampling of analog audio at 32, 44.1 and 48 kHz in 16-bit PCM format. Captured audio data is down-sampled and reformatted if necessary by Microsoft system audio components, allowing an application to capture audio data in 8-bit and 16-bit mono or stereo formats at any of the following data rates:

8 kHz
11.025 kHz
16 kHz
22.05 kHz
32 kHz
44.1 kHz
48 kHz

Audio Playback

Osprey cards provides audio capture only, not audio playback. Continue to play back captured audio using your system soundcard.

Audio Configuration

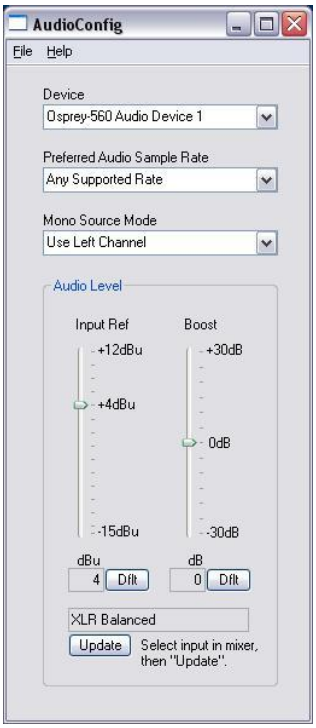
The AudioConfig applet is included as part of the Osprey AVStream driver package. It is also provided in source form in the Osprey AVStream SDK. It provides supplementary controls that are not available via the standard system properties.

AudioConfig's controls are device-specific and apply only to Osprey audio capture devices. Use the Device menu list at the top of the applet's window to select which device you are controlling.

Preferred Audio Sample Rate

The audio sample rate is the rate at which the hardware samples the incoming audio, which may differ from the sample rate delivered to the client application.

Figure 63. AudioConfig



The choices are to allow Any Supported Rate, or to force the sampling rate to be 32 kHz, 44.1 kHz, or 48 kHz. If Any Supported Rate is selected, all three rates, 32, 44.1, and 48 kHz, are available for selection by the Microsoft Kmixer driver. Kmixer, however, does not necessarily select the optimum hardware rate for a given software rate. It may specify a 44.1 kHz hardware rate when supplying 16 kHz software rate to the application, for example. In this case it would be better to set the Preferred Audio Sample Rate 32 kHz, so that downsampling is exactly 2:1.

When the audio input is SDI, the only sample rate that the Osprey hardware supports is 48 kHz. The driver will override your setting here.

When the audio input is DV1394, you have to use this control to match your audio sample rate to the actual rate of the incoming data. The two most common formats are 48 kHz/16-bit, and 32 kHz/12-bit. You may have to listen to a captured sample of your audio to determine whether the sample rate is set correctly – if the pitch is incorrect, try the other setting.

Mono Source Mode

If set to Use Left Channel, then left channel audio data is copied to the right channel.

If set to Use Right Channel, then right channel audio data is copied to the left channel.

If set to Average Left and Right, no copying is done.

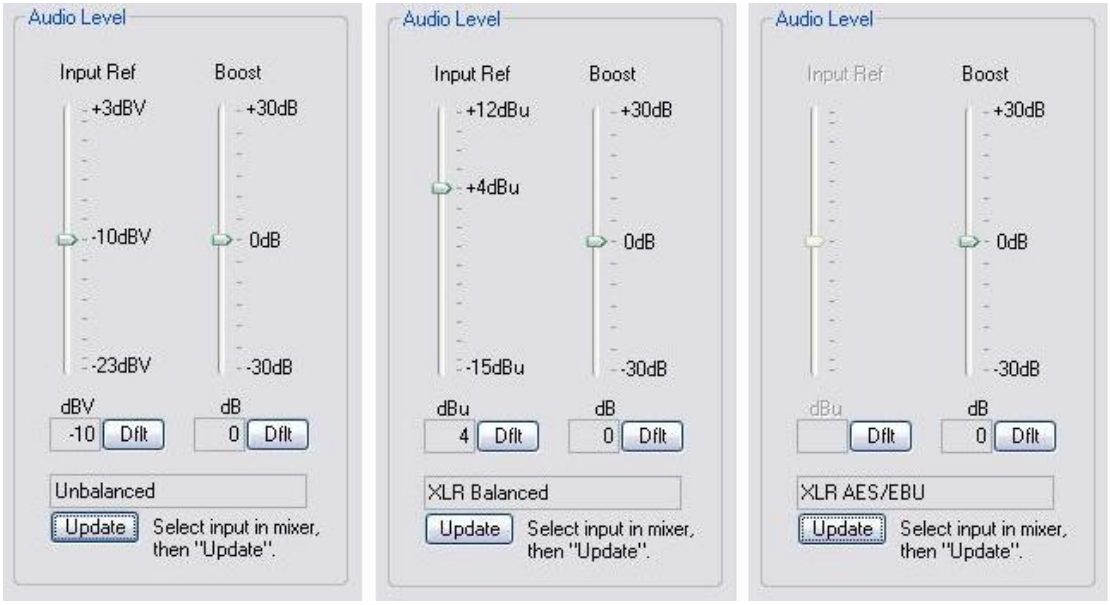
The Microsoft Kmixer component always averages both channels when converting to mono. If a signal is present on, say, the left channel only, the Average mode will average the left channel with

the silent right channel, effectively halving the signal amplitude. Setting this control to Left will result in only left channel data in the mono capture, with no amplitude drop.

Audio Level

This control sets the hardware Input Reference level and software-based Boost factor. The settings are separate for each input of each device, and are applied to whichever input is selected in the current application or in the system mixer. The settings displayed do *not* automatically update when you change inputs in the application or mixer click **Update** to refresh the settings.

Figure 64. Audio Level



As the screenshot above shows, the Audio Level control is different depending on which input is selected.

The Input Reference level is meaningful only on the analog unbalanced and balanced inputs, and is calibrated differently for each. When a digital input is selected this control is disabled. This is a hardware gain control with the default level chosen such that the expected amplitude of a full volume input signal will have adequate headroom without clipping. If you do experience clipping, or are working with very low-level signals, you can adjust this level. On this control, a higher reference level results in lower gain, so the quietest setting is at the top of the scale. Click **Dflt** to restore the default value.

The Boost setting is a software gain adjustment that applies to both analog and digital inputs. Boost can be set individually for each input. It supplements the system mixer volume controls by providing a very wide adjustment range. You can use it to calibrate or normalize input levels across multiple inputs; or to accommodate microphones or other non-line inputs that have nonstandard signal levels. Again, **Dflt** restores the default value.

Appendix A: Osprey hardware specifications

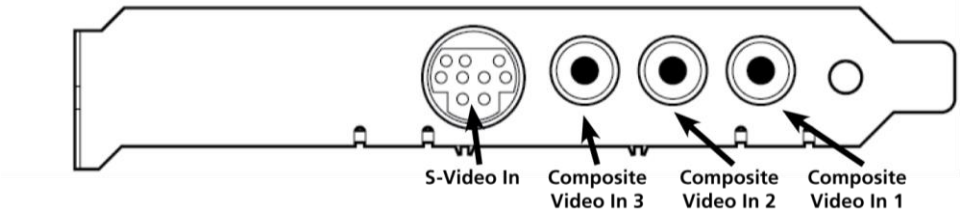
Osprey 100

Figure 65. Osprey 100

Environmental specifications

Operating temperature range	0° to 40° C
Non-operating temperature range	-40° to +75° C
Operating humidity range	Between 5 % and 80% (non-condensing) @ 40° C
Non-operating humidity range	95 % RH (non-condensing); gradient 30 % per hour
Operating altitude range	0 to 3,048 meters (10,000 feet)
Non-operating altitude range	0 to 15,240 meters (50,000 feet)

Osprey 100 backplate

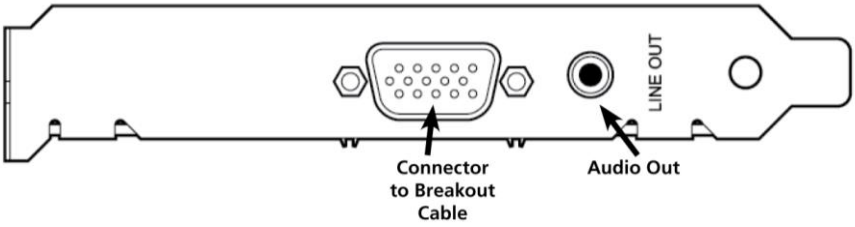


- PCI Local Bus 2.2
- Compliant
- Approximate card weight = 68 grams

Osprey 210

Figure 66. Osprey 210

Osprey 210 backplate

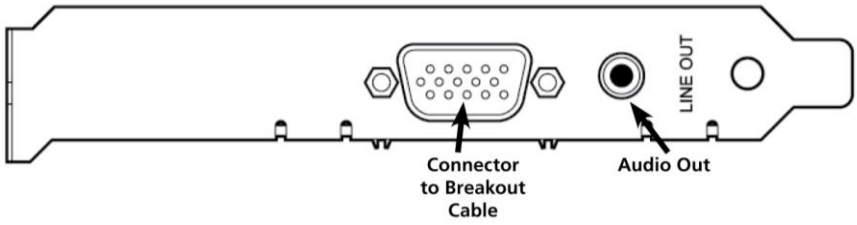


- PCI Local Bus 2.2
- Compliant
- Approximate card weight = 71 grams

Osprey 230

Figure 67. Osprey 230

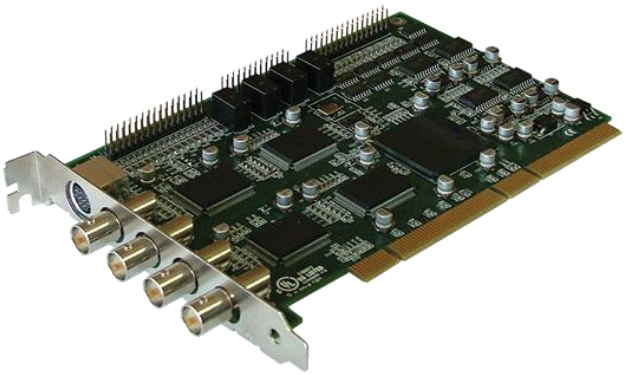
Osprey 230 backplate



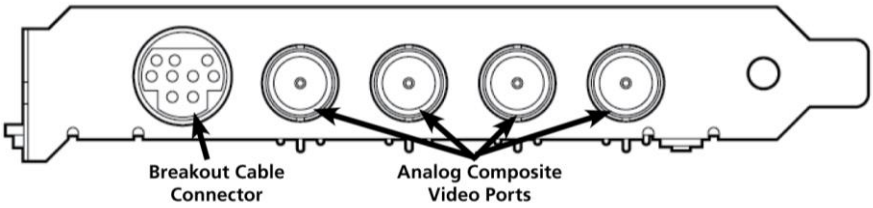
- PCI Local Bus 2.2
- Compliant
- Approximate weight = 85 grams

Osprey 440

Figure 68. Osprey 440



Osprey 440 backplate

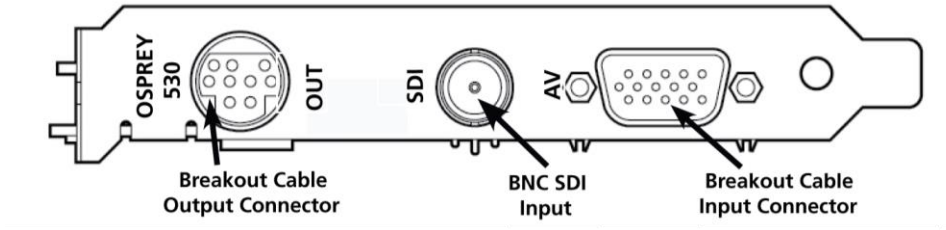


- PCI Local Bus 2.2
- Compliant
- Approximate card weight = 153 grams

Osprey 530

Figure 69. Osprey 530

Osprey 530 backplate



- PCI Local Bus 2.2
- Compliant
- Approximate card weight = 142 grams

Appendix B: Troubleshooting

Scrambled Video Image

You may have set the wrong video signal format for the signal input you are using. For example, you may have told the driver to look for NTSC-M video but are using a PAL-BDGHI video source. Make sure you know what signal format your video source is generating. Go into the Video Standard field of the Control Dialog's Source page, and click the button for that signal format.

Poor Video Quality at Large Frame Sizes

Large frame sizes with the deep pixel depth (24- or 32-bit), or complex format (YVU9 or YUV12 planar), impose heavy demands on the PCI bus's data transfer capacity. Our experience is that some systems cannot handle these formats at full frame sizes.

Systems vary in their data transfer limits. The characteristics of the PCI bridge are often more important than processor speed.

This problem should only arise if you have multiple Osprey cards or 1 or more Osprey 440 operating concurrently. Typical usage of a single Osprey card would not cause this kind of problem.

If you are having problems, we recommend that you:

- Use a smaller frame size (480x320 or less).
- Use a shallower color format (RGB15 or RGB24 instead of RGB32).
- Try a YUV format instead of an RGB format, and a packed format instead of a planar format.
- If you have a choice of PCs for video capture, try using another system with a different system board chipset.

Multiple Horizontal Lines Across Video Image

If there are multiple, regularly spaced, horizontal lines across your video image and your source material is copyrighted and copy-protected, you are seeing Macrovision™ copy protection.

The lines can vary in color from yellow to blue to green. These lines are not present in every frame of video. There may also be a black band at the top of the frame.

The Osprey 530 card cannot eliminate these video artifacts. These artifacts will only be present when you are using a copy-protected source, such as a high-quality DVD for testing a card.

There are other brands of copy-protection besides Macrovision. Some of these employ similar methods (resulting in the above) and others do not. This is a good example of Macrovision effects but you should find a good way if possible to briefly note that there are other forms of copy protection and that they may have different effects on the picture.

No Closed Captions on DV

The Osprey 530 is capable of decoding closed captions on NTSC video inputs. This feature is supported on SDI and analog video sources - the composite and S-video inputs, and digital SDI, only.

Cannot Play Back Recorded Audio

If you have a sound card installed, you should be able to hear audio when you play back recorded audio.

- Verify that the volume control for your playback device is not muted.
- Some Windows applications cannot use a recording device unless a playback device is also installed. The Placeholder device cannot play back recorded audio. You can use the same method to select playback device that you use when selecting the audio source.

Audio Recording Control Comes Up With Wrong Device and Wrong Inputs

The cause of this problem may be that you currently have or have had previously, a Video for Windows audio capture driver installed in the system. The Osprey AVStream install process normally removes a previous Video for Windows driver, but if you have multiple Osprey cards installed you do have the option of running the Video for Windows driver on some cards and the AVStream driver on others. Unfortunately the Recording Control does not work smoothly in this situation. The Video for Windows device will always try to act like it is the selected device even if it is not. You have to manually enter Recording Control's Options -> Properties dialog to select your device.

If you no longer have need for the Video for Windows driver, you can uninstall it using instructions obtainable from Osprey technical support. If you are comfortable using RegEdit to edit your registry, you can instead go to the following location:

HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Drivers32

and delete all REG_SZ entries named "mixer" or "mixer1" ... "mixer9" that have the name of an Osprey mixer as their data. These names will be o2ca_mix.dll, o5ca_mix.dll, or o540_mix.dll.

Index

16:9 Wide, 31

1X Scale, 62

480-lines, 32

525-line, 66

525-Line (NTSC) Vertical Format, 30, 32

525-line / 625-line buttons, 32

525-line formats, 80

625-line, 66

625-line formats, 80

A

ActiveMovie Window, 84

Adaptive Deinterlace, 42

Allow multiple instances of each filter, 37

Any Supported Rate, 91

Apply, 11

Audio Formats, 90

Audio Level, 92

audio playback, 90

AudioConfig, 90, 91

Auto, 25, 40

Auto Size, 70

B

B&W composite camera, 18

Backlight Comp, 25

basic reference size, 76

Black and white composite camera, 18

Board Numbering, 48

Both, 54, 66

Both button, 54, 66

Brightness, 25

Browse for Image…, 58

Browse for Image… button, 59

Buffers requested, 46

Buffers Requested, 45

C

Cancel, 11

Captioning via CC or VBI pins, 82

Captions, 11

Captions tab, 53

Capture, 54, 66

Capture button, 54, 66

CC Pin, 54

C (cont.)

CC Streaming Interface, 83

CCIR-601, 30

Cine Phase, 41

classes of Osprey devices, 5

Closed Caption DirectShow Pin, 56

Closed Caption Timestamping, 51

Color Format, 80

ColorEnable, 25

Composite video, 15

Contrast, 25

Currently Using, 36, 41

CVBS, 15

D

Default, 25

Default Output Size, 65, 70

Deinterlace, 36, 40

Device, 11

Device Info, 46, 52

Device tab, 45

Diagnostic Logging, 45, 47

Digital input formats, 19

Digital Signature Not Found Screen, 5

Direct CC Rendering on Video, 83

Direct Mode, 74

DirectShow, ii, 7, 13, 27, 35, 46, 49, 51, 52, 55, 56, 65, 70, 72, 73, 75, 77, 78, 79, 82, 83, 86, 89

DirectShow®, ii, 13

E

Enable Cropping, 65, 68, 69

Enable Key Color, 60

Enable Key Color on File and Color sub tab, 58

Enable Logo check box, 57, 59

Enable Logo on File and Color sub tab, 57

Extras, 46, 50

F

File and Color, 59

Filters, 11

Filters tab, 35

Filters, pins, and properties, 72

G

Gain, 25

Gamma, 25

Granularity, 65, 67

H

Horizontal Delay, 30, 31

H (cont.)

Horizontal Format, 30

Hue, 25

I

Initial Osprey Config user interface, 8

Input Format, 15, 18

Input tab, 14

Installing the video capture card, 4

Inverse Telecine, 40, 41

L

Lines detected, 28

Logo, 11

Logo tab, 57

M

Microsoft Kmixer driver, 91

Mode, 36, 39

Mono Source Mode, 91

Motion Adaptive, 40

Motion adaptive deinterlace, 41

Motion Threshold, 42

Multiple Filters, 38

N

No Video Test Pattern, 46

No-Video Test Pattern, 45

Nudge buttons, 62

O

Off, 41

OK, 11

Osprey 100, 93

Osprey 210, 94

Osprey 230, 95

Osprey 440, 96

Osprey 530, 97

Osprey Config, 7

Osprey Config utility to access devices, 13

Osprey's Device Properties window, 10

Output Enable, 28

P

PCI Compatibility Mode, 51

Pin Select, 53, 57, 59, 65

Position and Size, 62

Position and Size sub tab, 58

PostProcessing, 39

PostProcessing Mode, 75

PowerLine Frequency (Anti Flicker), 25

Preview, 54, 66

P (cont.)

Preview button, 54, 66

Preview pin to overlay mixer to video renderer, 77

Preview pin to video renderer, 77

Preview pin to VMR7, 78

Preview pin to VMR9, 79

Processor Assignment, 51

R

Recalc, 69

Recording Control, 88

Reference Size, 65, 66

Reference Size for Crop and Logo Placement, 30, 32

RefSize, 11

RefSize tab, 29

Render, 55

Render Logical White as, 54

Render Logical White As, 55

Render NTSC Closed Captions On Video, 53

Reverse field order, 18

RGB24 option, 78

S

Saturation, 25

Selecting a device for configuration, 9

Separate video, 15

Serial Digital Interface, 15

Sharpness, 25

Show [4] filters per device, 38

Show board ID info field, 49

Show filters, 37

Show N filters per device, 37

Show Properties for Selected Filter button, 9

Signal Detected, 28

SimulStream, 36

SimulStream evaluation is enabled, 36, 37

Size and Crop, 11

Size and Crop tab, 63

Smooth and Sharp Motion, 43

Source Width, 30, 33

Square Pixels, 30

SVideo, 15

System Settings Change dialog box, 6

T

Telecine, 11

Telecine video, 41

Test Mode, 43

Timecode Video Making, 85

T (cont.)

Timecode Video Marking, 51

To move a board from one slot to another, 5

Tolerance, 60

U

Use WideScreen Signal, 31

Use WideScreen Signal (WSS), 31

V

Vbi Pin, 51

VbiGraph, 15, 22

VbiGraph utility, 23

Vchip, 55

VCR Input, 28

Vertical Interval Timecode, 84

Video Capture Properties, 11

Video Decoder, 11

Video Decoder tab, 27

Video Filter, 73

Video Input, 15

Video inputs available with Osprey 230, 15

Video Mixing Renderer 9, 79

Video Present, 15

Video Proc Amp, 11

Video Proc Amp controls, 76

Video Proc Amp tab, 24

Video renderer, 77

Video standard, 80

Video Standard, 15, 16, 28

VideoCheck, 15, 20

VideoCheck utility, 21

VideoGraph, 15

VMR7, 78

Volume control, 87

W

Warranties, 1

Weighting, 61

Weighting on File and Color sub tab, 58

White Balance, 25

Y

YUV, 81

YUY2 mode, 81

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